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THE BOOK OF THE GOAT.

THE
BOOK OF THE GOAT.

CONTAINING
FULL PARTICULARS OF THE VARIOUS BREEDS OF GOATS
AND THEIR PROFITABLE MANAGEMENT.

BY
HENRY STEPHEN HOLMES PEGLER.

With Illustrations.

THIRD EDITION,
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TO

The Right Honourable the Baroness Burdett-Coutts,

BY WHOM

THE FIRST SHOW OF GOATS IN GREAT BRITAIN

WAS INAUGURATED,

AND THROUGH WHOSE INFLUENCE,

ENCOURAGEMENT, AND WELL-KNOWN BENEFICENCE THE PRESENT

IMPROVED CONDITION OF THE MILCH GOAT IN THIS

COUNTRY IS IN GREAT MEASURE DUE,

THIS WORK IS DEDICATED

BY

THE AUTHOR.



PREFACE TO THE THIRD EDITION.

RATHER more than ten years have elapsed since I contributed to the 'Bazaar, Exchange and Mart' the series of articles on "Goats and their Management" which were subsequently published in book form in the first edition of this work. Goats as milk-producers were not generally recognised at that period, and it was in consequence of the numerous queries that appeared in the columns of the journal above-mentioned, asking for information on the treatment of these animals, that I was induced to give my experience, in the hope that others beside the actual querists might derive the advantages from keeping them that I had myself acquired. I had no idea, however, at the time that I was preparing a work which would eventually appear under so important a designation as 'The Book of the Goat,' and it was only when it blossomed forth into its higher stage of existence as a bound volume, that I realised the insignificance of the material I had supplied in comparison with the comprehensive nature of the title. It has ever since been my hope that the subject I had taken up and made my special hobby, might one day become sufficiently popular to warrant the publication of an enlarged edition, which, by being treated in a more exhaustive manner, would be better worthy of the name bestowed upon it. That time has, I consider, arrived. The

rapid strides by which goat-keeping has advanced in the last few years, has rendered a revised edition absolutely necessary to preserve the utility of the work, and render it worthy of its title. During this interval the popularity of the animal has greatly increased. Goat shows are now held annually in London and the provinces. Goat farms have been started as a commercial enterprise, and a Goat Society has been established under influential patronage, with the object of improving the breeds, and encouraging the keeping of goats amongst the labouring classes.

These circumstances have contributed a vast amount of information, both in respect to the varieties and management of these animals. The spirit of rivalry induced by the offering of prizes has caused the introduction of foreign specimens, which had rarely, if ever before, been seen in this country, whilst the reading of papers and discussions on matters connected with the treatment of goats at the meetings of the Goat Society has opened up a more extensive view of the subject.

Through officiating in the capacity of judge at most of the shows, and from being honorary secretary of the Society referred to, I have had special opportunities for improving my knowledge on many points connected with goats, and this has been farther extended by an additional ten years of practical experience with a great variety of breeds, and on a much larger scale. This will explain any difference of opinion which may be discovered in my remarks in this work compared with what I have previously written, my views on some points having been, for the reasons above-mentioned, modified or altered.

In this edition all the chapters will be found considerably enlarged, and many new ones introduced; amongst others, that relating to the early history of the goat, for which I am indebted to the Rev. W. Houghton, M.A., F.L.S., through whose kind assistance and research I am thus able to give a record of the animal from the most remote period.

The foreign breeds of goats, with which I had comparatively little practical acquaintance when I first wrote on this subject, will, in the following pages, be found exhaustively treated of, particularly the Angora, which from its commercial value must be regarded as the most important of the genus *capra*. For the engravings of, and much valuable information concerning, the Swiss and Nubian breeds, my thanks are due to Mr. Paul Thomas, of New Malden, who at great expense and trouble imported specimens of these varieties into England, thereby enabling me to inspect them and obtain photographs from which the woodcuts illustrating these goats have been taken.

In revising the chapter on Diseases, I have to acknowledge the kind assistance I have received from Professor J. Wortley Axe, whose friendly help in the treatment of my goats under sickness, and in *post mortem* examinations, I have often had occasion to seek, and always successfully.

Some explanation is perhaps necessary, in conclusion, to account for the difference in the name of the author in this and the cheap edition which preceded it, compared with that under which the 'Book of the Goat' first appeared before the public. I should therefore state that when I first wrote on the subject, I selected as my *nom de plume* my two centre names, 'Stephen Holmes,' but as my connection with the British Goat Society and British Dairy Farmers' Association brought me more prominently before the public, I found it necessary to establish my identity and to appear in all my subsequent writings under my full name :

HENRY STEPHEN HOLMES PEGLER.

Hemel Hempstead, Herts.

December, 1885.

THE BOOK OF THE GOAT.

CHAPTER I.

INTRODUCTION.

THE Goat has been appropriately termed "The Poor Man's Cow," and certainly no better designation could be found to express the position of this useful creature amongst our domestic animals. In this respect it may be placed in the same category as the pig, for it converts waste vegetables and other refuse matter into milk as the latter transforms such substances into meat. To a certain extent indeed the goat holds even a higher position than the pig; inasmuch as it provides the food of mankind from his earliest infancy; furnishing those very elements of nutrition so necessary to build up the foundation of a robust and healthy constitution, the greatest blessing of life. All doctors are agreed that milk, and plenty of it, should be the principal diet of children in the early stages of their existence, if a perfect development of the frame is to be secured. Milk, however, is not generally available in England as it should be; In the towns it is usually obtainable without difficulty, though its purity is often questioned, but in villages and the outlying cottages the article is rarely tasted except by those who can afford to keep their own cow. This may sound absurd to some people who have never personally inquired into the matter, but it is nevertheless a fact. The demand for milk in the towns

and cities, and the facilities afforded by railways for its conveyance thence from the most remote parts, entirely drains the rural districts, where the farmers, who contract to send away every drop they can obtain, object to supply small quantities retail. It often happens indeed that milk is most scarce in the very neighbourhoods whence the largest supplies are procured, consequently the cottagers' children, after they are weaned, rarely taste it otherwise than skimmed. In the character of the poor man's cow, therefore, the goat is peculiarly adapted to supply this great want, in doing which it may be regarded almost as a national benefactor, for by improving the health and physique of the rural if not the general population it is contributing to the well-being of the community.*

The position that the goat deserves to occupy amongst the people of this country, and that which it actually holds, are, however, two different things. In spite of its useful qualities it is still far from being recognised to the extent that it merits. This is not the case in Ireland nor in most parts of the continent, where it is highly prized for the virtues of its milk. In the Emerald Isle large numbers are bred annually, and although they lead a rough life they contribute materially both by their milk and flesh to the welfare of the Irish peasant. Some interesting statistics contributed by a correspondent of the 'Live Stock Journal' in 1881 showed the distribution of goats throughout Ireland to be as follows:—

Province.	1880.	1881.	Increase.	Decrease.
Leinster ...	67,493	65,924	—	—
Munster ...	88,182	88,877	695	—
Connnaught ...	37,102	37,589	487	—
Ulster ...	73,012	74,163	1,151	
Total	265,789	266,553	764	1,569

The total in 1872 was 238,961, thus giving an increase in the nine years of 27,592.

According to the same correspondent, goats abound most in

* See Dr. C. E. Shelly's remarks in the chapter on Goats' Milk.

Kerry and Cork, the former having 23,442 and the latter 22,857. Next on the list comes Co. Cavan with 15,442, followed by Co. Tipperary 12,952 and Co. Monaghan 12,305. At the same time large numbers are exported annually from these counties into England. During three weeks in July, 1880, these exports amounted to as many as 900 head. Information of this kind is most interesting, and it is much to be regretted that similar returns are not compiled by the Board of Trade of the number of goats in Great Britain. Application has been made to the Department by the British Goat Society with that view, but hitherto unsuccessfully. Indeed England and Denmark are the only countries having no statistics on the subject, as evidenced by the following table borrowed from the source already quoted, which shows the distribution of goats over Europe, with the number per cent. of the population of each country.

Country.		No. of Goats.	No. per cent. of Population.
Great Britain	...	...	No Statistics. —
Denmark	...	...	—
Ireland	...	266,553	5·0
Norway	...	290,985	16·5
Sweden	...	124,673	2·9
Russia	...	1,700,000	2·4
Finland	...	30,639	1·7
Austria	...	979,104	4·8
Hungary	...	572,951	3·7
Switzerland	...	374,481	14·0
Prussia	...	1,477,335	6·0
Bavaria	...	193,881	4·0
Saxony	...	105,847	4·0
Wuertemberg	...	38,305	2·1
German Duchies	...	212,388	7·7
Holland	...	146,169	3·9
Belgium	...	197,138	4·1
France	...	1,794,837	5·0
Portugal	...	936,869	23·3
Spain	...	4,531,228	27·9
Italy	...	1,690,478	6·3
Greece and the Ionian Isles	...	1,339,538	91·3
Roumania	...	194,188	4·3
Total in Europe		17,198,587	

As regards goat-keeping in England it may be urged, and with truth, that this country is not so well adapted to the animal as are many parts of the continent, on account of the climate and the large area of land under cultivation. The naturally roving disposition and well-known mischievous propensity of the goat are its great drawbacks, placing it at a disadvantage in a closely cultivated country like ours as compared with other stock, it being impossible to pasture them in herds like sheep and cattle, on account of the damage they do to trees and hedges.

Goats are accordingly only met with to any extent in mountainous regions and open tracts of moorland. This accounts for the large number in proportion to the population in countries like Norway, Switzerland, Spain, and Portugal, though according to the returns they are most numerous in Greece and the Ionian Isles where, if the figures given may be relied upon, there exists very nearly one goat to every head of population.

The above objection against goat-keeping has only reference, however, to their maintenance in herds, and does not equally apply in cases of two or three, for when this number is kept they can easily be tethered, and are thus prevented from doing injury to surrounding fences. There are many acres, indeed, it may be said miles, of grass by the roadsides in England, which at present is made no use of, and might be turned to good account for pasturing goats belonging to cottagers living close by. It is in fact in a private way chiefly that I have advocated goat-culture in this country, and although goat-farming as a business may be made a profitable undertaking under certain circumstances, as will be shown in a subsequent chapter, it is mainly for family use as a source of pure home-supplied milk that the animal is specially adapted.

CHAPTER II.

ORIGIN AND EARLY HISTORY OF THE GOAT.

THERE is but little doubt among naturalists, that the numerous varieties of the domestic goat are all descended from the Paseng, or *Capra Aegagrus*, a species common all through Asia Minor, Persia, and extending even into Scinde. The fossil remains of some species of goat which have been found in the newer Pliocene deposits ; as for instance, at Walton in Essex, seem to corroborate this opinion. "The jaw and teeth," writes Professor Owen, to whom the fossil remains were entrusted, "agreed in size and configuration with the same parts in the common goat, and also in the sheep ; and the highly interesting question which of these had existed contemporaneously with the mammoth and the rhinoceros, was satisfactorily determined by the cranial fragment. In its shape and size, and especially in the character of the cores of the horns, which were two inches in length, subcompressed, pointed, and directed upwards, with a slight bend outwards and backwards, it closely agreed with the common goat (*Capra Hircus*), and with the short-horned female of the wild goat (*Capra Aegagrus*). In the sheep, the greatest diameter of the horn is across the longitudinal axis of the head ; in the goat it runs almost parallel with it—a character well shown in the present fossil. Whether the *Capra Aegagrus*, or the *Capra Ibex*, should be regarded as the stock of the domesticated goat of Europe, has long been a question among naturalists ; the weighty argument which may be drawn from the character

of the wild species, which was contemporary with the *Bos primigenius*, and *Bos longifrons* in England, is shown by the present fossil to be in favour of *Capra Ægagrus*.* That the *Capra Ægagrus* of the mountains of Asia occasionally crossed with some allied species, as with the *C. Falconeri* of India, is not improbable, and the idea is held by M. Brandt and other authorities.

The goat appears to have been domesticated from very early days, as is evidenced by the remains which have been found; though these are generally in a very fragmentary condition. According to Professor Rütimeyer, the ancient inhabitants of the lake-dwellings in Switzerland seem to have used the goat more frequently than the sheep; the goat of these ancient lakemen, which apparently differed in no respect from the race now common in Switzerland, was probably brought thither by some people migrating northwards from the Mediterranean countries. The late Professor Rolleston, who had opportunities for examining the very rich collections of animal bones from various lake-dwellings, found that "the goat is richly and unambiguously represented in the stone-age lake-dwellings, and more abundantly indeed than the sheep in the early stone-age lake-dwellings of Moosseedorf. It seems, however, to have lost this numerical preponderance towards the end of the stone-period, and to have become comparatively scarce in the bronze age. M. Kinberg, Stockholm 'Internat. Congres Anth.' p. 831, tells us of Sweden that "La Chèvre (*Capra hircus*) paraît avoir été primitivement plus rare que le mouton. Elle est rare du moins dans les sépultures de l'âge de la pierre de la Vestergötlande." These facts are entirely in keeping with the suspicions hinted at in the text, and with the view that our domestic animals, though coming in the ultimate resort from the East, did not reach the regions north of the Alps directly from the East, but only by passing

* Owen's 'Brit. Foss. Mam.' &c., p. 490.

northwards from the Greek and Italian peninsulas. For the goat, as has been repeatedly observed from the time of Aristotle ('Hist. An.' ix. 4) down to the present, bears cold less well than the sheep, whilst every traveller in sunburnt barren countries may observe with gratitude and wonder what copious supplies of milk are obtained from it, often off but limited areas in these surroundings, and from but shrubs and weeds.

The goat possesses certain advantages over the sheep as a domestic animal in "a barren and dry land where no water is," but in a palustrine or lacustrine district it possesses none. And I submit, therefore, that the abundance of it in the Swiss lake-dwellings can be reasonably explained by supposing that it was carried thither by a people or tribe migrating northwards from the Mediterranean countries. (Appendix, p. 740-1, Note. 'British Barrows,' Greenwell and Rolleston.)

The wild goat of the East was doubtless in very early ages domesticated and made subservient to the wants of man; and in course of time, as the inhabitants migrated westerly, taking their live-stock with them, the goat was introduced into Europe and other countries. In the East, however, was its original home; and especially in many districts of Persia, where it is now found in a great range of climate; it is in Persia, therefore, that we ought perhaps to have the earliest records of the goat, but unfortunately nothing historically is known of the early periods of Persia, and it was not till the wars of Alexander and his successors that the Greeks formed any real conception of the position and character of the land from which their ancient and formidable enemies took their name. The goat is at present preferred to the sheep in Persia, and this predilection has existed for a long time, for the Greeks, as Herodotus, when he enumerates the various flocks and herds of Cambyses, the father of Cyrus, appears to assign the chief place to the goats (I. 126), and the Persians, Cyrus himself included, are represented as goat-herds (*αιπόλοι*, *Aipoloi*). The word *pásang* is

the name of the male of the wild goat, and signifies in Persian, "the rock-footed," the female is called *Boz*, or *Boz-pásang*, though the term *Boz* is also applied to both sexes of the common domestic goat. ('Zoology of Persia,' Blandford, p. 90.)

It is very probable that the Accadians, or ancient inhabitants of the high lands of Elam, from very early periods domesticated the common goat, and that the wild kind existed on the mountains of their own lands and those adjacent. The names given to animals often throw light on the countries originally inhabited by them ; the Accadians frequently adopted this kind of nomenclature ; thus, one of the names of a "wolf" in the Accadian language denotes "high," implying that the wolf descended into the low lands from the hills of Armenia ; the "horse" is "the beast of burden from the East," pointing to Armenia as its early home. There are two or three words for a goat in the same language, one of which appears to denote the animal "with elevated horns," which is well suited to the goat, as its figure is shown on the monuments from Assyria.

One of the Sanskrit names for the he-goat is *aja*, that of the she-goat is *ajā*, with the final vowel long. This word has considerable interest ; it comes from the root *aj*, "to go," "to drive," "to lead ;" its meaning is preserved in the Greek *ἀγω*, and the Latin *ago*. In the most ancient form of Sanskrit, that of the Vedas, the epithet *aja* is given to certain deities, as to Indra, Rudra, Agni, and the Sun, &c. ; in later works, to Brahma, Vishnu, Síva, and Káma ; it denotes "the leader of the flock," a "he-goat," or "ram," and from the numerous compounds of *aja* which occur in Indian writings, goats must have been well known. In Indian mythology the goat forms a conspicuous figure. Now it represents the sun veiled by clouds of grotesque and demoniacal form ; now the grey-white and golden sky of the morning ; or the golden and grey-white sky of evening, and now the moon.* In the 'Khordah Avesta' ("little Avesta")

* Gubernatis, 'Zoological Mythology,' i. p. 401.

or "texts") of the old Iranians, we find Veretraghna (Indras) "with the body of a warrior he-goat, handsome, and with sharpened horns." *

That much, if not most of the tales of European mythology, originated in the East, is a well-ascertained fact; the Aryan migrations westerly spread their ideas, and though the fables vary considerably in some of their details, yet it is clear from whence the earliest forms were borrowed.

The goat was known to, and held in high estimation by, the ancient Jews of Palestine, who used several Hebrew words to describe this animal at various ages; thus *ēz*, from *āzaz*, "to become strong," generally signifies a "she-goat;" *gedi*, "a kid" from one to nearly three years old; a kid just weaned was called *gādāh*, i.e. "cast out" of the body. *'Attūd* is a "he-goat," from a root meaning "to make ready," "prepare," from the idea of the goat taking the lead of the flock. Compare what was said above of the Sanskrit *aju*; and see Jer. 1. 8, "Remove out of the midst of Babylon and be as the he-goats before the flocks." The names *Tsāphîr* and *Sā'ir* mean "hairy," hence used of a goat, especially of a he-goat. One other word occurs here and there, namely *Tayish*, from a root signifying "to push with the horns;" this Hebrew name is preserved in the modern Arabic *tays*, the ordinary name of the he-goat. From the strength and boldness of the he-goat the Hebrews sometimes spoke of this animal figuratively to denote a "prince" or "chief"—"Mine anger was kindled against the shepherds, and I punished the he-goats" (Zech. x. 3; comp. also Isa. xiv. 9). A traveller writes: "The stately march of the he-goat before the herd, and his haughty bearing, as well as the dauntless stare with which he scrutinizes a stranger, are well known by all familiar with the East; and the he-goat is still commonly applied by the Arabs as a simile for dignity of manner and bearing." The Jews sacrificed goats as offerings to Jehovah;

* Avesta, Spiegel and Bleeck, 'Khordah-Avesta,' p. 106.

their milk was an important item of food ; goat's-hair was used for weaving into cloth ; the inflated skins for bottles and swimming-bladders. The flesh of the kid was held in high esteem, and it was much more frequently used as food than that of the lamb, large numbers of which were reared for the sake of the wool ; calves were generally regarded as too expensive a luxury, except on some festive occasion. Hence one can see the full force of the prodigal's complaint in Christ's parable—"Thou never gavest me (even) a kid, that I might make merry with my friends, but as soon as this thy son was come, . . . thou hast killed for him the fatted calf" (Luke xv. 29, 30).

The goat of Palestine (*Capra Mambrica*, Linn.) is a well-marked variety of the common *Hircus Aegagrus*; it has thick pendent ears, often a foot long. The prophet Amos probably alludes to this long-eared goat when he speaks of a shepherd "taking out of the mouth of the lion two legs or a piece of an ear." The Syrian goat, which is larger than our English goat, has long black hair and thick recurved horns. It should be mentioned that in the North of Palestine the variety known as the Mohair goat (*Capra Angorensis*, Linn.), which has long silky hair, is occasionally bred.

The wild goat of the rocks and hills of Palestine, and of the Peninsula of Sinai, is occasionally mentioned in the Biblical records. The Hebrew word is *yâ'dâl*, from a root meaning "to climb," and well describes the Ibex (*Capra ibex*), the *Beden*, or *Jaela*, a relative of the Swiss steinbock, now pretty common in Arabia Petrea, and not very rare in some parts of Palestine, as in the neighbourhood of Engedi ("Fountain of the Kid"), near the Dead Sea.* The wild *Capra Aegagrus* has not, I believe, been noticed in Palestine.

The Assyrians made use of the goat for the same persons as their Semitic relatives, the Hebrews : figures of the domestic goat

* See a coloured drawing of the *Capra Beden* in Tristram's 'Fauna and Flora of Palestine,' Plate II.

occur on the monuments ; it has high horns either curving backwards, or nearly erect ; in the former they divaricate, in the latter they are nearly parallel. The cuneiform names of the he-goat, *a-tu-du* and *tsap-pa-ru*, answer to the Hebrew *'attûd* and the Chaldean *tsâphîr* already mentioned, and has the same meaning of a he-goat. The skins were employed for various purposes ; among others as swimming-bladders or buoys ; after removing the head and legs the skin was prepared, perhaps steeped in tannin, and filled with air. There may be seen on the monuments, now in the British Museum, representations of Assyrian fishermen, sitting in the water, riding cross-legged on these inflated skins ; and on the bas-reliefs which show Assurnatsir-pal's campaigns (*circ. B.C. 884*), figures of fugitives swimming to the fortress are seen, each one using an inflated goat-skin as a buoy. The Assyrians frequently make mention of wild-goats *ya-e-li* (comp. the Hebrew), probably denoting thereby the Asiatic Ibex, noticed above, which is found in the hilly parts of Assyria and the adjacent countries. The *Capra Ægagrus* also occurs wild, and doubtless was known to and hunted by the Assyrian kings and nobles.

The ancient Egyptians seem to have possessed large flocks of goats and sheep from very early times ; for if Manetho, in the dynasties of Egyptian monarchs as quoted by Africanus and Eusebius, be correct, the goat was well known during the second dynasty ; it was the second king of this dynasty, who is said to have introduced and instituted the worship of animals which at a later period of Egyptian history so extensively prevailed. This monarch's name was Kakau, or *Khaiechós* ; he reigned thirty-nine years ; by him the bulls *Apis* in Memphis and *Mnevis* in Heliopolis, and the goat of Mendes were appointed to be gods. If we date the beginning of the first dynasty in the time of Menes, the first monarch of the country, at about B.C. 3000, or according to Brugsch at 4400 B.C., and deduct from the first number 263 years as the total number of years

required for the eight kings of the first dynasty, and thirty-eight years for the reign of Butau (or Boethos of the Greeks), the first king of the second dynasty, we find that king Kakau would come to the throne about B.C. 2700. He it was who some time during his life instituted animal worship, the goat *Baëntattu* being venerated at Mendes. Hence, if Manetho is to be trusted, goats were known to and worshipped by the ancient Egyptians from so remote a period as nearly 2700 years B.C. We learn from Herodotus (ii. 46) that the goat was sacred in the Mendesian nome, or canton, where great honours were paid to it, especially to the male; but the goat was not universally held sacred in Egypt; for by some of the inhabitants of Upper Egypt it was sacrificed. When a he-goat died the whole Mendesian nome went into mourning. According to Strabo and Diodorus this animal was held sacred in some parts of Egypt, as the emblem of the generative principle. The flocks of goats kept by the richer class of the Egyptians appear to have been often very considerable; in a tomb near the Pyramids of El-Gezeh, in the time of Khaf-ra (Cephrenes) of the fourth dynasty, the flocks and herds of the chief occupant are represented thus: 834 oxen, 220 cows with their calves, 2234 goats, 760 asses with their colts, and 974 sheep, showing, as in the case of Job, what large properties of this kind were sometimes owned in ancient times. The goat was known to the Egyptians by the names of *ankh* or *ankhu*, *kaka*, "he-goat," and *teb*; *kaari* seems to denote flocks collectively. Besides the ordinary uses, goats were employed by the old Egyptians for the purpose of treading in the newly-sown corn to protect it from the various finches and other birds which would otherwise devour it.

The ancient Greeks and Romans paid great attention to the rearing of goats. Any one at all familiar with classical authors will remember how frequently these useful animals are mentioned, especially in the Greek and Pastoral poems.

The ordinary Greek word for a “she-goat” is *aix* of the feminine gender ; but Homer in ‘Odys.’ xiv. 106, has the word in the masculine gender. Homer mentions goats as being used in sacrifices, as affording nourishing food and milk, as being scattered in broad flocks over pastures ; the skins of sheep and goats were used as coverings for a bed. In the ‘Odyssey’ Homer represents Antinous and the suitors watching over the cooking of the black puddings of goats, just before Ulysses and Irus, the beggar of Ithacus, had a fight. “These bellies of she-goats are being cooked on the fire ; having filled them with fat and blood, we lay them aside for supper” (xviii. 45). The expression “bleating goats” is not unfrequently met with in Homer.

The word *tragos* denotes a “he-goat ;” the derivation of the name is referred to *tragein* or *trogein*, “to gnaw,” in allusion to the habits of these animals. The *tragōdia* of the Athenians (Tragedy), (literally “goat-song”), received its name either because a goat was the prize for the play, or because this animal was sacrificed during its performance, or because in the oldest Tragedies the actors were clad in goat-skins. A male kid not more than three or four months old was called *eriphos*, while a young goat of the first year was called *Chimaira*, or *Chimaros* by the Dorians. The derivation is from *Cheima*, “winter,” *i. e.* one winter old ; it occurs in Icelandic *gymbr*, “a ewe-lamb of a year old,” whence the provincial English *gimmer*, which in the North is the name of “a female sheep from the first to the second shearing.” Homer uses the word *Chimaera* of some fire-spouting monster, having the head of a lion, the tail of a serpent, and the body of a goat (‘Il.’ vi. 181). Hesiod (‘Theog.’ 319) gives the creature three heads, that of a lion, goat, and serpent.

It was customary among the Greeks to give names to their goats ; thus, in Theocritus (‘Id.’ v. 103) Lacon the goatherd addresses two of his herd which were browsing on the oak : “Be off, won’t you, from the oak, you Conarus and you

Cynætha? Feed eastward as Phalārus does." Conarus and Phalarus are the names of two he-goats; Cynætha is a female. The fifth idyl of Theocritus gives us interesting information connected with goats and goatherds; to it I must refer the reader. The Latin writers on agriculture ("Scriptores Rei Rusticæ"), as Varro, Columella, and others, have discoursed on goats, their management, their diseases, and the various breeds. From what they have written it appears that the Romans divided their goats into two classes. I. Those which had fine hair, and sawn-off horns. II. Those with shaggy hair, whose horns were allowed to grow. A good he-goat, according to Columella, should have the following qualities:—It should show under the lower jaw two small warts (*verruculæ*) hanging from the neck, and should have a large body, thick legs, a full and short neck, flaccid and very long shiny hair.* The Romans used either to shear † or pluck the hair from the goats; as they did also with their sheep; the Latin term *vellus*, "a fleece," is derived from *vello*, "I pluck," referring to this custom.

There was a very prevalent belief amongst these people, that goats were never altogether free from fever, or from a liability to take it; and so Varro in his instructions about purchasing goats

* It is curious to notice how the Roman writers, as Varro and Columella (practical agriculturists of their day), Pliny and others, lay stress on the importance of goats having these abnormal jaw appendages, the possession of which was supposed to indicate excellence of breed and a prolific nature; whereas by Sanskrit writers these appendages were properly regarded as of no importance whatever. In the Hitopadésa (Introduction, l. 26) a man destitute of virtue is "like the throat-nipple of the he-goat, —his birth is useless;" the Ajagala-stana, *i. e.* "goat throat-nipple," is an emblem of any useless person or thing. I do not know whether these appendages are frequent on our domestic animals or not; I have myself occasionally observed them; but whether they have any significance or not in the animal, or how they are to be accounted for, I know not. It is certainly curious that pigs as well as goats should have occasionally similar abnormal appendages.

† From Lucian ('Piscator,' 46) it appears that the same custom prevailed among the Greeks. *Tragokourice machaira* was an instrument for shearing he-goats.

says, “ No sane person warrants his she-goats as sound ” (“ *capras sanas sanus nemo promittit*,” ii. iii. 5), “ for they are never free from fever,” so when you go to buy, you must make your bargain in a few such words as—“ About these she-goats, are they in good health to-day ? Can they drink ? Can you say they are well at present ? Can you warrant them thus far ? ”

Aristotle does not supply us with much information connected with the history of the goat. From him, however, we learn that people, the iris of whose eye is in colour like that of the goat, are said to be well disposed, and have acute sight ; that the male goat, as in sheep and swine, and man, has more teeth than the female ; and further, that he has been known to give milk, as for instance in Lemnos, where it gave enough milk to make cakes of cheese.

In Sicily and some other countries goats’ milk and ewes’ milk are mixed together, and it readily forms a curd. Goats, like oxen, sheep, and dogs, and all quadrupeds which produce their young alive, occasionally dream ; dogs show this by barking in their sleep ; goats, like sheep, have ticks (*κρύτωρες*), but not lice (*φθεῖρες*) ; their period of gestation, like sheep, is five months ; in warm weather and with abundant food the goat may have young twice a year ; it will live eight years. In the case of sheep, the shepherd selects and educates a ram to be the leader of the flock. The ram after training, when called up, places himself at the head of the flock, but with the goats no leader is constituted ; the she-goat brings two, three, or even four young ones at a birth ; goats though stronger in body are less healthy than sheep. Such are some of the statements of Aristotle with respect to the domestic goat ; some are correct, others fanciful and erroneous.

Pausanias (vii. 26) tells us of a curious use to which a number of goats were, on one occasion, put. The Sicyonians collected an army to invade the country of their neighbours, the *Ægeiratae* (the *Hyperians* of Homer) ; but these latter people, not

considering themselves a match for the Sicyonians, adopted the following stratagem :—They collected together all the goats in their land, fastened torches on their horns, and at night-time set fire to them. The Sicyonians, imagining that these lights proceeded from the auxiliaries of the *Ægeiratæ*, led their army home. It was from this circumstance that the ancient name of Hyperetia was changed to *Ægeira*, so called from *aiges*, the Greek for goats. In the place where the most beautiful goat, the leader of the rest, lay down, the people built a temple to **Artemis Agrotera**, “the huntress,” for they considered that the stratagem which saved them was effectual by the aid of Artemis. During the prevalence of an epidemic or pestilence, a goat was sometimes sacrificed to the rising sun. The people of Cleonæ, an ancient town of Argolis, did this, and when they were freed from the plague, they sent a brazen figure of a goat to Apollo (x. 11). Aelian quotes Orthogoras—a geographer, whose date is unknown, and who wrote a work on India—as stating that the people of Coytha used to give their goats dried fish to eat ('Nat. An.' xvi. 35).

With this we may compare what is said of the sheep of Tartary, that they “eat bones like a dog;” also what Strabo has recorded of the *Icthyophagi* of India, who on account of the scarcity of food and water, feed themselves and their cattle with fish; so that the flesh of these animals has a fishy flavour. Pliny has a chapter on goats, from which I must quote only a few words. He mentions the two small pendent folds or flaps (*lucinæ*) under the neck—already alluded to above, and which Varro called warts (*Verruculæ*)—as a mark of the most valuable females; goats breathe through the ears and not through the nose; he quotes Archelaus as his authority. An equally absurd idea held by some of the ancients was that the animal breathed through the horns. At sunset, as is said, she-goats in the pastures never look at each other, but lie back to back; at other times of the day they lie facing each other. The beard

is called *aruncus*, from the Greek ἄρυγγος. If one of the flock is dragged by the beard, the rest look on in stupid astonishment.

In *Aesop's fables*, the goat is generally represented as being not over clever, as in that one of the fox that had fallen into a well, and the Goat by whose assistance Reynard had got out. The Fox remarked to the Goat whom he left in the well, " If you had half as much brains as you have beard, you would have looked before you leaped." Against this I will give what Pliny, on the authority of an eye-witness, Mutianus, relates as to the intelligence of the goat, and with this little story I will conclude :—

" Two goats coming from opposite directions met on a very narrow bridge, which would not admit of either of them turning round, and in consequence of its great length, they could not safely go backwards, there being no sure footing on account of its narrowness, while at the same time an impetuous torrent was rushing rapidly beneath ; accordingly one of the animals lay down flat, and the other walked over it."

CHAPTER III.

VARIETIES OF MILCH GOATS.

THEIR is, probably, no animal (the dog excepted) that has a greater range of variety than the goat, which is met with in most parts of the world, and appears as much at home in the cold regions of Norway and Sweden as in the hot countries of Asia and Africa. These varieties differ in the length, colour, and texture of the coat, the shape and size of the ears, the contour of the face, and the configuration of the horns; some having a strong resemblance to the *Aegagrus* or wild goat, whilst others partake more of the character and appearance of the sheep. A French writer, on the authority of an 'Encyclopædia of Natural History,' classifies the varieties into four distinct groups. 1. Goats with short prick ears, as the common goat, the hornless goat, and the dwarf goat of Guinea. 2. Goats with long, wide pendulous ears, as the Syrian and Nubian or Egyptian. 3. Goats with drooping ears and curly woolly coat, represented by the Angora; and lastly, those having semi-pendulous ears and a downy undergrowth of wool, as the Cashmere. Another French writer, without grouping them in this manner, simply recognizes four distinct breeds, which he describes as the common goat, the Angora, the Cashmere, and the Nubian. Neither of these views appear to me correct. There must be either *two* distinct species *only*, or there are considerably more than four. The species I refer to are the Cashmere and Angora representing the wool-bearing breeds, and the other goats whose

coats are composed chiefly of hair. This is the great distinction, but in the case of the Angora at least, not the only one, as I shall point out when describing this animal. At the same time, as regards the nature of the coat, it is a difference which is not so much one of kind as of degree, since all goats possess the two coverings, wool and hair. There is a downy undergrowth, and sometimes of considerable quantity in our own breeds, as may be easily observed on examination ; it serves as a protection against wet and cold, and is present, I believe, to some extent in all quadrupeds, thus corresponding to the down between the feathers of birds.

Most writers on the goat seem to recognize a common species which with certain variations is dispersed all over the world. There is no doubt that in many countries—of Europe at least—the same type of goat prevails, though showing many modifications. These modifications, however, are in some instances so very decided, that it becomes difficult to distinguish the characteristics by which the term "common" is to be recognized ; in other words, to know where to draw the line between what is "common" and what is not. One writer, as I have already shown, takes the ears as the point of distinction, representing the common goat as having erect ears, whilst the other varieties (with the exception of those he places in the same group) have ears wholly or partially pendulous. In doing this, however, he omits to take into consideration two European breeds, the Maltese and Pyrenees, the ears of which are decidedly pendulous, although it is to be presumed he includes them amongst the common kinds, seeing that they are not mentioned in any other group. The ears are undoubtedly a peculiarly distinctive feature of some breeds, and when lopped or pendulous,* generally betoken Eastern origin. This peculiarity is shared, as I have just shown, by some European

* Sir Samuel Wilson thinks that the pendulous ear shows long domestication.

varieties, and is no doubt due to importations from the East. The generality of goats met with in Europe, however, especially in the northern countries, are of the prick-eared type; but neither by these organs or by the horns or length of coat is it possible in my opinion to define a common goat. As a matter of fact, nearly every country in Europe possesses a breed differing more or less from that of its neighbour, and where the breeding of a certain kind has been particularly confined to one locality, to the exclusion of all other varieties, the difference is plainly observable. On the other hand, where specimens are constantly being brought from abroad, the foreign blood becomes soon intermixed with the native, and all sorts of crosses are apparent, so that the original race becomes almost extinguished. Thus, in Great Britain, where goats are brought from all parts of the world, the greatest variety prevails, and any one versed in the different breeds may discern amongst the generality of goats in England some characteristics of every known kind. This is far less the case in Ireland, and some of the mountainous parts of Wales, where the goats are all of one type.

As regards hornless goats, which the author I first referred to places amongst the prick-eared varieties, it is a question whether there exists a breed without horns, which may be relied on to reproduce that peculiarity without deviation. I am inclined to share the opinion of Professor Simonds, late Principal of the Royal Veterinary College, that there is no hornless race, but that the absence of the corneous appendages is purely a freak of nature apparent in all breeds though doubtless in some more than in others, according to the fancy of a people for encouraging and perpetuating the peculiarity. At the same time, there can be no question but that by a careful selection, and breeding always from polled goats, a strain could be established which would produce, with tolerable certainty, hornless stock. The French writer referred to, although placing it as a separate variety under the classification described,

furnishes but little information respecting it. He says: "The goat without horns appears to have a rather ancient origin, for the modifications which characterize it are deeply rooted. We know in other respects but little concerning this pretty creature, whose most esteemed quality consists in the value of its flesh, which possesses but little odour, and is very good eating, being often mistaken for mutton." He then concludes by saying, "The hornless goat is of Spanish origin." Now the country where hornless goats are most common is Malta, and the close proximity of that island to Spain would lead to the inference that the Maltese is the kind here alluded to, especially as it is not mentioned elsewhere in the work. If this be so, however, the grouping is certainly at fault, seeing that the Maltese goat has decidedly pendulous ears, and cannot therefore be placed in the same category as the prick-eared varieties.

From the foregoing remarks it will be seen that, excepting the division of the species referred to, I am not in favour of grouping the breeds into sections, as adopted by French writers, for the simple reason that I fail to see how this can be consistently carried out. I shall therefore make no attempt at classification, but content myself with describing the varieties of each country that possess features of interest and points of distinction.

BRITISH VARIETIES.

It has already been observed, that on account of the many foreign specimens imported into this country, there exists considerable diversity amongst the goats of Great Britain; nevertheless, there are certain points of distinction between the varieties of England, Ireland, and Scotland, which may readily be recognised.

The English Goat :—I have been at some pains to ascertain the points of the original English breed; and from the descriptions in old works in which goats are mentioned, and

a comparison with the features most prevalent at the present time, I believe the following description to be correct :—Head neat and tapering, with moderate beard ; frontal-bone prominent, horns set far apart, rising slightly at first with an inclination to the rear, and then branching outward ; ears rather large, but not actually erect nor yet pendulous, but more approaching a horizontal position, pointing forwards. Body long and square-shaped, with the coat short, but not so close as in the Nubian and some Indian varieties. In the male it is much longer, particularly at the neck, chest, and thighs, where it is very thick and stiff. A fine soft, woolly under-growth is nearly always observable between the hair. The colour ranges from black to white, but is more often light or dark fawn, with a darker line along the back, and black on the legs. The illustration given (on Plate VIII.) represents an English she-goat once in my possession, but which unfortunately died in the winter of 1875. I regarded her as a perfect type of her kind, and the artist has faithfully depicted her in every point but the head, which is here rather too thick, and with a mouth too coarse. The English goat is a good milker, her yield being not only plentiful but of excellent quality. The breed has been very much improved of late years in the hands of a few fanciers who, by a careful choice of stock, have produced a strain that may be relied on to breed true to type.

The Irish Goat :—This is of quite a different type to the English ; the hair is long and shaggy, generally a reddish black and white, or yellowish grey and white. The head, instead of being short and tapering, is long and ugly, the muzzle being coarse and heavy, with a considerable amount of beard even in the females. The horns are large and pointed, situated close to each other, and rising almost perpendicularly whilst inclining to the rear. Those of the male are very large, and attain sometimes an immense length, a pair in my possession measuring each 30 inches. Besides the increase in size, they

open out more than those of the female. The size and shape of the horns render both male and female formidable antagonists when pugnaciously inclined, which they not unfrequently are, both to each other and to persons who are strangers to them, so that they are not altogether safe with children. The Irish goat is a rather taller animal than the English, but its gaunt, flat-sided appearance renders it anything but prepossessing. It is nevertheless a good milker, though the yield is comparatively poor in quality. The udder is generally long and narrow, with big teats.

Large droves of Irish goats make their appearance annually throughout most of the market towns in England and Scotland, the herdsman, who is always a thorough Hibernian, calling them "Welsh," though for what reason I have never been able to discover, unless it be on account of their having been landed in Wales on their arrival from Ireland. This, however, is not the only false statement generally made by these itinerant drovers, as I shall have occasion to point out in another chapter.

The Welsh Goat is said to have been originally a very large kind, and mostly white. At the present day, however, such is not the case. In many points it resembles the Irish goat, but is smaller and more symmetrically-shaped; the head and horns being more graceful, and the body lighter. This breed is not of much value for milk; the udder and teats are usually small, and it does not remain any length of time in profit.

Scotch Goats:—There are two varieties in Scotland. The Highland goat, which is met with mostly in mountainous parts of the north, is a small, long-haired species, rather like the Welsh; but with much larger horns, which grow back in a graceful curve towards the rear like those of the Ibex or wild goat. The ears are sharply "pricked," and there is a tuft of hair over the forehead like that in Highland cattle. The other variety is more like the English, being short-haired or nearly so; larger and heavier in the body, and of a more

domesticated nature. There is a considerable number of this description on the Island of Mull, a large portion of which are white; they being good milkers of rich milk. The most prominent breeder in Scotland at the present time is Mr. Andrew Adie, of Crossford, Dunfermline, who has established a strain renowned alike for remarkable size and valuable milking qualities. One of the largest he-goats yet exhibited, "Captain," which took first prize at the Crystal Palace Goat Show in 1883, was bred and shown by this gentleman, but is since dead.

FRENCH VARIETIES.

An inquiry was instituted in 1883 by the Société Nationale d'Acclimatation of Paris, on the subject of goat-keeping in France, and various questions were drawn up and sent to correspondents in the different departments, having reference to the varieties kept in each, the methods of treatment, utilization of products, and other matters of interest. The result was embodied in a report drawn up by Monsieur J. Gautier, and published in the Journal of the Society. From the answers to questions put, it appears that there is even greater variety among the goats of France than of Great Britain; but at the same time there exists no particular French breed (though M. Gautier himself is of a contrary opinion). The characteristics differ chiefly in those departments bordering on the Alps and Pyrenees, the goats of these mountains being of quite a distinct type from the rest. I shall, therefore, confine myself to a description of these breeds.

The Alpine Goat :—This is a tall, lank-looking animal, generally hornless, with a long neck and long ungainly-looking legs; it is short-haired, often of a fawn and white colour, and has large ears which hang forward. Although the build and general appearance of the animal does not convey the idea of a milker, its yield is in reality very abundant. The udder is

long and narrow, and very soft and flexible. This breed is met with chiefly in the Lower Alps, and in many respects resembles the Toggenburgh, to be described further on.

The Pyrenean Goat :—Of quite a different appearance is the Pyrenean goat, which is long-haired, with great horns and large pendulous ears. It is the tallest, according to my own observation, of all domestic goats, some being almost as big as a small donkey. The first specimen of this breed introduced into this country was, I believe, the one exhibited by Miss Jacomb, at the Dairy Show of 1880, and subsequently purchased by the Rev. H. R. Peel. A year or so after a whole drove was imported by an enterprising Béarnais, who might be seen daily about the streets of London, at the head of his herd, which he called together by the sound of a horn or Béarnais flute. The milk from these goats was sold, freshly drawn on the spot, in little tin mugs at a charge of 1*d.* each, though what the quality was like I cannot say, considering the animals, for want of better pasturage, seemed to feed chiefly on the bills of the advertisement hoardings. Shortly after this some fine specimens were imported by Messrs. Freeman and Dormer, who crossed them with their own strain of Abyssinian and British ; the result, as appeared at the Dairy Show in 1884, far exceeding in proportions anything yet produced in the way of goat-breeding.

The illustration (Plate II.) represents one of these imported goats belonging to Mr. Dormer, which carried off the Champion Prize at the Dairy Show two years in succession ; besides winning other first prizes elsewhere. Whether the yield of this extraordinary large variety is in proportion to its size, and the increased quantity of food it necessarily consumes, is a question I am yet unable to answer. All I can say is, that nothing very remarkable in this way has been obtained to my knowledge at present, though I believe, by careful crossing with some of our best milking strains, a superior milking

breed may be secured. For the benefit of those desirous of importing some pure specimens of this variety, I append the name and address of a French mountaineer who breeds large numbers, viz. Martin Cazenave, Chevrier à Arbéont, Canton d'Aneure Arrondissement d'Argelés, Hautes Pyrénées.

SWISS GOATS.

Switzerland, with its mountainous slopes and pastures, may be regarded as the land *par excellence* for goats, and as these animals play an important part in the milk supply of the country, it naturally follows that some of the best breeds for this purpose are here to be found. The Swiss goats generally surpass our British breeds in size, shape, and appearance, but there is some diversity amongst them. Those most frequently encountered are short-haired with prick ears, long tapering horns rising straight up at first and then pointing to the rear. The legs are rather short, neck and body long, and udder and teats large and capacious. They are of every colour, from white through all the shades of fawn, to red, brown, and black. This is a description of the generality of goats met with throughout the mountains, but there are two distinct varieties, which differ as much from each other as the English goat does from the Irish: they are the "Toggenburgh," and the breed of the Haut Valais, commonly known as the "Schwartzhals" (black-necks).

The Toggenburgh Goat.—A very fine pair of these goats were recently imported into England by Mr. Paul Thomas of New Malden, one of which, the female, was exhibited at the Dairy Show of 1884, and won first prize. A very good illustration of this animal is furnished by the engraving (on Plate VII.), taken from a photograph.

This goat is fine in bone, with a long, thin neck, deep, wedge-shaped body, and a large wide udder, which is remarkably soft and pliable—all essential qualities of a good milker. The ears are thin and large, hanging out horizontally. On the neck will

be noticed two tassel-like appendages, though these are not peculiar to the breed, being noticeable occasionally amongst nearly every kind of goat.* The Toggenburgh goat is generally hornless, and of a rather unusual colour, being a pale drab, commonly known, I believe, as "mouse-colour," with a few patches of white. Both the imported specimens referred to are alike in this respect, and the kids born from them are exactly similar.

The Schwartzhals.—This is a long-haired and long-horned breed of large size, somewhat similar to the Irish goat in general appearance. It has, however, a much neater head, and is less coarse-looking than the latter. The horns curve back like those of the chamois, but with a lock of hair protruding in front. The chief peculiarity of this variety consists in its being black or dark brown on the head and neck, and sometimes as far as the shoulders, the other half of the body being quite white; it is to this characteristic that it owes its name. Another uncommon circumstance in connection with this goat is, that it almost invariably has but one kid at a birth, though it yields a large quantity of milk. The quality, however, is comparatively poor, and not equal to that produced by the Toggenburgh. The Schwartzhals has the merit of being a remarkably hardy breed, whilst the other is more delicate, the former being out night and day all the year round, whilst the latter are housed after dark except in the height of summer.

A good milch goat in Switzerland fetches from £2 to £3.

THE MALTESE GOAT.

If a really hornless breed of goats exists it is the Maltese, there being more polled specimens amongst this variety, I believe, than any other. The greater proportion indeed are of the hornless type, and white or greyish white in colour, with brown or black spots. It is long-haired, of rather large size, with a long neck and head, the facial line being nearly straight. The

* See footnote on page 14, chap. ii.

ears are of considerable length and width, and as pendulous as those of a double-lobbed rabbit. All the goats of this breed that I have kept myself or seen were thin bony creatures with very flat sides, but they were nevertheless remarkably good milkers. The udder is long instead of round, hanging down between the thighs, and with large teats like little udders themselves, which when full of milk nearly touch the ground; it is of a deep orange-red colour, with very often large black spots interspersed about it, the skin generally being something of the same tint.

Malta is one of the few countries where attention has really been paid to goat-breeding for milking purposes. Here the pairing of the sexes is carefully conducted so as to breed only from good milking stock; consequently this variety can be generally relied on as first-rate milkers. In Malta goats' milk is the principal milk consumed, the animals being driven night and morning through the streets, and milked before the doors into the different receptacles provided by the consumers. Owing to the length and shape of the udder these goats are always milked there from the rear instead of at the side as in this country.

Maltese goats are met with in great numbers in Algeria, and many are also imported to India, where they are held in high esteem for their milking qualities. Indeed, of the many correspondents who have written to me from abroad on the subject of goat-keeping, all are unanimous in placing this variety foremost amongst milkers.

THE NUBIAN GOAT.

This breed, which is found in Nubia, Upper Egypt, and Abyssinia, and also with a slight modification as far south as the Cape, differs very considerably from our European varieties. Its chief peculiarities consist in the length of its large, drooping ears, and the shape of its head, which might almost be described as triangular. The facial outline is strongly convex, the forehead being very prominent, whilst there is a considerable

depression at the nostrils, which lie in a kind of hollow, the under jaw being slightly projected beyond the upper. The hair on the forehead grows in thick close curls something like that of a shorthorn bull. The ears are very wide, and of such extraordinary length that they hang considerably below the jaw, turning up at the tips. The horns vary, sometimes growing almost flat upon the head, at others pointing upwards and outwards, but always of a very dark colour and showing a slight twist. The hair is comparatively short in the male, but very much so in the female, whose coat in summer is as glossy and sleek as that of a racehorse. The colour is generally quite black, but sometimes black and dark Indian red, or dark tan, with some few marks of white.

In size it surpasses most other kinds, this being due to the extraordinary length of its legs, which with its long neck and other peculiarities gives it a rather uncouth appearance. Du Plessis, in his French treatise on the goat, gives this breed a most wonderful character; he says it is the most gentle and quiet of any, and also remarkably fertile, breeding readily twice a year, and generally having three kids at a birth. As to its milking qualities, according to this writer, they are to be equalled in no other breed, in support of which statement he gives his experience with a pure Nubian, which was milked twice daily for five consecutive days, the milk being carefully measured and tested with a lacto-butirometer. The results obtained are given in the following table, which shows the quantities in litres, a litre being as near as possible a pint and three-quarters:—

	Milk.	Cream.
1st day	4.39 litres	38.00 centilitres.
2nd ,,	4.41 "	38.48 "
3rd ,,	4.53 "	38.50 "
4th ,,	4.67 "	39.69 "
5th ,,	4.94 "	40.30 "
	<u>22.94</u> ..	<u>194.97</u> ..

Thus it will be seen that the average daily return amounted to nearly a gallon, the per-cent-age of cream being even more extraordinary.

Another quality he gives to this breed is that the male has not the objectionable scent pertaining to ordinary he-goats. This statement, however, I am not able to endorse, as in the few pure specimens I have met with, the same smell has been observable, though I must confess in a minor degree.

The Nubian goat is less hardy than our European breeds, and cannot stand cold, especially damp cold. Hence it has to be kept in the stable quite half the year, and requires generous feeding.

The illustration (on Plate IV.) here given represents a young Nubian he-goat named "Arabi Pasha," black with white ears, the property of Mr. Paul Thomas, who imported it with a female of the same breed from France, where they formed part of a herd, descended from stock sent over some years ago from Nubia, for the *Société d'acclimatation* of Paris. "Arabi" took second prize as a kid at the Crystal Palace in 1883, and subsequently in the same year first prize at the Dairy Show. He is now about two years old, and stands thirty-two inches at the shoulder. The female, "Aida," is a good deal smaller, but thoroughly maintains the quality of her breed for milk. Her udder is large and round, and extremely soft and pliable, and although she has only kidded once, and her kids, through an accident, were born dead, and prematurely, she yields over two quarts of very rich milk daily.

INDIAN AND CHINESE GOATS.

Indian Goats :—The varieties met with in the East Indies are chiefly of the lop-eared type. The best are what are known as the "Jumna Pari," which are bred along the Jumna river, and common on the Bengal side. They closely resemble the Nubian, having, like these, long, wide, pendulous ears, a bow-shaped face,

and being tall and leggy. The horns are upright and often spiral-shaped, though in some cases they are closely recumbent on the head. The hair is very short, being beautifully sleek and glossy, and generally of a red tan and black colour. They are splendid milkers, carrying immense udders with big teats. Another variety largely kept in India is the *Surat* goat, which is generally white and lop-eared. Specimens of both kinds are occasionally brought to this country, having been used on board the steamers to supply milk to the passengers.

Chinese Goats :—Besides the Cashmere there is a common variety known as the “*Shan Yang*,” signifying “hairy sheep,” which is met with in China. It is a large kind, with very long hair and straight horns; the skins of these animals are frequently sold in England for mats and hearthrugs. Most of them are black, a very favourite colour with the Chinese, though white and gray ones are also met with. The flesh of the goat is more eaten in China than any other animal excepting the pig.

THE SYRIAN, NEPAUL, AND JUIDA GOATS.

These breeds, which differ but slightly from each other, are very much of the same description as the Nubian. The Syrian, which is met with in Lower Egypt and other Eastern provinces, has ears of still larger proportions than the Nubian, and curling up more at the ends, the hair also is longer. A very good specimen was exhibited by the Crystal Palace Company at the first goat show held there in 1875.

CROSS-BRED GOATS.

There is such a vast number of cross-bred goats, especially in England, that whilst on the subject of breeds it is advisable to offer some remarks upon the crosses that may most advantageously be made. From my own experience I do not consider that for practical purposes a pure specimen is always the best. Of course

when for any special purpose it is required that a variety should be kept pure, as in breeding Angoras for their mohair, for instance, it is a different matter, but as far as milk goes, a cross-bred goat, so long as it possesses a good milking pedigree, is quite equal to one of pure blood. I rarely, however, found it satisfactory to breed a short-haired with a long-haired goat, and therefore do not recommend an English and Irish cross. The produce is generally a nondescript kind of animal, with long hair on the ridge of the back and on the hind legs, and sometimes a good deal under the belly. The horns are usually long and coarse, and more branching than the Irish, though the general appearance of the latter predominates.

English and Nubian cross.—Of the different cross-breeds I have seen and tried this is undoubtedly the best. The English goat crosses well with either the Nubian, Abyssinian, or Indian varieties, giving the progeny a hardier nature than these foreign breeds generally possess, and rendering them more adaptable to our climate. There is also, in my opinion, a gain in the appearance of the produce over the latter, as they lose a good deal of the "legginess" of the Nubian, and are more rounded in the ribs. The face, too, whilst still preserving the angular shape and delicate nostrils, is greatly modified as regards the bowed or arched outline.



HEAD OF CROSS-BRED GOAT, ENGLISH AND NUBIAN.

As to the milking qualities, I do not believe they are in any way impaired, but rather the contrary, provided, as I just remarked, that the parents are good milkers of their kind. One of the most remarkably shaped goats of the many I have encountered was an animal of this description, partly English and partly Abyssinian. This goat won the first prize

at the Dairy Show of 1883 in the short-haired class, far surpassing for quality and shape every exhibit in the show. It was very wide in the chest, long in the body, and splendidly ribbed. The nose is somewhat coarse in the woodcut (Plate V.), which however shows the great breadth at the forehead to perfection. This illustration was made from a photograph of the animal when out of profit, hence it has but little udder. Its milk yield, however, has since proved to be superior to the average.

A very strong recommendation for the Nubian or Abyssinian cross lies in the fact that at nearly every show that has been held—in the metropolis at least—the greater proportion of the prize-winners are bred in this manner. Among the most notable may be cited Mr. Crookenden's "Kitty" and the Baroness Burdett Coutts' "Duchess" and "Polly," all winners of prizes.

The opinion I have formed of goats of this kind seems to be shared in France, for Huard du Plessis in writing of the different varieties says: "Crossings have been effected between the pure Nubian male and native she-goats with the most satisfactory results, for apart from the superior milking qualities of the offspring, they have acquired a better shape. Whilst residing at Vincennes, a neighbour owned a magnificent she-goat, a cross between a Nubian male and a common female, and we had daily opportunities of admiring the fine shape and magnificent udder of this beautiful animal. Being desirous of testing its milking qualities we measured the yield each day during five consecutive days with the following result:—

1st day	...	3.57	litres yielding	0.22	litres of cream.
2nd	„	3.42	„	0.21	„
3rd	„	3.35	„	0.20	„
4th	„	3.62	„	0.23	„
5th	„	3.69	„	0.24	„
Total		17.65	„	1.10	

The Book of the Goat.

The litre being about $1\frac{1}{4}$ pints, the daily average was thus as nearly as possible three quarts."

This cross produces also nice plump meaty kids, the skins of which are very handsome, being very close-haired and beautifully smooth and glossy. The males, when emasculated, make capital goats for draught purposes, and look extremely well in harness when their coats are well-brushed, and not very unlike miniature horses in their bodies, especially those in which the long legs of the pure Nubian blood predominate. On the whole this cross may be recommended as one of the most serviceable kind to keep.

Crossing with the Angora Goat.—I cannot help thinking, and I believe I am not alone in this idea, that it would be quite possible by carefully crossing some of the best milking strains of the common goat with the Angora to produce an animal that would embody in itself the qualities of both breeds, and whilst giving a plentiful supply of milk would yield mohair of sufficiently good quality to be marketable, thus making the cross doubly profitable. Regarding this question the following remarks, contained in a letter from Colonel J. W. Watts to Colonel R. Peters, which I extract from Dr. Hayes' book on the Angora Goat, are extremely interesting :

" I began with the milk goat, had two varieties—the long, rough-horned Maltese, and the short-haired South American. About the year 1872 I came in possession of three Angoras—one billy and two nannies . . . I bred this billy to my milk goats; the result being a beautiful lot of large, well-formed half-breeds, showing no fleece ; he was bred to his kids the next fall, which produced a pretty animal with considerable fleece, which grew to be about 3 inches in length. Those descended from the short-haired goat had a much more uniform fleece than those from the long-haired goat, and some of those retained their long straight hairs through the fourth and fifth crosses. The length of fibre is about 3 inches on the second cross, and continues to

increase in length on each cross until five crosses are made, when it is about equal in appearance and value to the thorough-breds. Whilst the thorough-bred has rarely more than one kid at a birth, the grade (crossed) usually has twins, which they raise well, especially those graded from the milk goat, as they retain their milking properties for several generations. I had a half Angora and half Maltese ewe that gave four quarts of milk per day for months, and after half of her udder was destroyed she raised two kids each season until her death, usually the largest on the farm."

About three years ago a pair of Angora goats were sent over from Australia as a present to the Baroness Burdett Coutts, and located at Highgate. These were crossed with some half-bred English and Nubian goats on the estate, and produced some very handsome stock, partaking strongly of the mohair breed. One of these exhibited at the late Dairy Show carried as much flesh as a fat sheep, which, being hornless, it strongly resembled. As this animal, the first-fruit of the cross, has not yet bred, it remains to be seen whether it will inherit the grand milking qualities for which the goats of the Baroness's own strain are so noted, as well as the fat-forming attributes of its imported parent.

Can the Goat be crossed with the Sheep?—This seems a moot question, but from the evidence I have been able to gather I am led to the belief that it cannot. Mr. R. Peters, a contributor to the 'American Agriculturist,' who has had great experience with Angora goats, writes:—"Prior to the year 1860 I tried many experiments, in hopes of obtaining a cross between the goat and sheep, and failed in every instance. Extensive correspondence with other breeders has convinced me that the cross cannot be obtained. Dr. J. Bachman, the celebrated naturalist of Charleston, S. C., who was in correspondence with the most distinguished naturalists of Europe, informed me that he had no faith in the theory, and did not believe the cross

obtainable." On the other hand, Sir Samuel Wilson states that the cross between the goat and the merino sheep has been tried, and the progeny was not unfertile, though it reproduces with difficulty. He mentions that "Professor Cretzchmar, a learned naturalist residing near Frankfort-on-the-Maine, experimented on twelve merino ewes and an Angora buck, with the hope of establishing a breed of animals intermediate between the two, but it was not till the third season that the experiment succeeded, and the progeny so closely resembled the merinos that little difference could be noticed in their external characters."

CHAPTER IV.

WOOL-BEARING GOATS.

THE ANGORA GOAT.

THE Angora, known also as the mohair goat, cannot be regarded otherwise than as a distinct species, approaching more in its appearance and characteristics to the genus *ovis*. The face resembles that of the sheep, both in outline and expression, whilst the similitude is rendered still more striking by the thick fleecy covering which envelops the animal from the top of the head down to the hocks (see Plate VI.). This analogy extends even to its milk and flesh, the former being, though less abundant than in other breeds, richer in nitrogenous elements, containing, like sheep's milk, a larger proportion of caseine; whilst the meat has the flavour and texture of mutton. Even the bleat of this breed resembles more that of the sheep than the goat, the cry being softer, and more approaching the "baa" of the lamb. It is doubtless owing to these facts that Pallas regards this breed as a cross between the goat and the sheep, though it is the general opinion of naturalists at the present day that it is descended from the *Capra Falconeri*, whilst the varieties described in the last chapter have their origin in the *Aegagrus*. In spite, however, of its resemblance to the sheep, there are many points which clearly denote that the Angora belongs to the genus *capra* and not to the genus *ovis*. This is particularly exemplified in the male, which besides exhibiting that capricious nature so peculiar to its species, possesses a

beard—an appendage of which the ram is entirely devoid, and above all gives forth that peculiar odour, natural to the male goat of every breed, though in a far milder form in this than in any other. The scent indeed is not noticeable at all in the Angora buck, except during the rutting season.

History of the Breed :—Although Asia Minor is at the present time the home of the Angora, it has been established beyond doubt that the introduction of the breed into that country is of comparatively recent date, having been imported originally from the mountains of Thibet. This gives colour to the statement that both this and the Cashmere are the produce of the same wild goat *Capra Falconeri*. Indeed it is only within the last twenty or thirty years that writers have come to regard them as distinct, for in spite of the great dissimilarity in the appearance of the two breeds, the fact that they are both wool-bearers has been sufficient to identify them under the general name “Cashmere or Angora” goats, in which manner they are constantly referred to in old works. An account of the introduction of the Angora into Asia Minor was published some years back in ‘The Field’ newspaper, from which I give the following extract :

“ The first European record of the mohair goat dates from the year 1641, when Busbek, the then Dutch Ambassador to Charles V. of Constantinople, managed to secure a pair of these animals, and sent them as a curiosity to his imperial master, with a strong recommendation that they should be introduced into Europe. Busbek explains that he was informed they had been recently introduced into Asia Minor from Armenia. All later inquiries support this theory, for in districts where they have succeeded best, the graziers assert that they came from the Eastward. According to tradition they were first kept as household pets, and they still retain in a high degree the gentleness and tame-ness derived from this early method of domestication. The beauty and silkiness of their fleece attracted the admiration of

the female members of the household, who quickly appreciated its value as a fibre for the private manufacture of articles of adornment in female attire, each family at that period keeping from five to ten goats for their especial use. All the extra fleeces not required for the purpose mentioned, were used for stuffing beds. In this way this delicate and valuable animal was preserved before mohair came to have a commercial value. At the present time it is extinct in the regions where it derived its origin."

Varieties :—“The most northerly point at which the mohair goat thrives is Kastamboul,” says Mr. Gavin Gatheral,* “a large and fertile province, but too near the moist winds of the Black Sea to reach its highest development, the fleece, though lustrous, being hard and coarse. Angora, the capital of the province of that name, produces five different varieties from as many districts, each equal in area to the largest English county. Yabanoon produces a heavy, lustrous fleece. Tchorba, a mohair so soft and fine that it falls to pieces as soon as shorn from the goat’s back. Tchiboukooa is remarkable for its length and fineness. Ayash produces a white but lustreless fleece. The rams of the three first-named districts are undoubtedly thorough-bred, and though smaller in size than some other varieties, have all the points that a practical stock-breeder commends. . . . Jewar, or Near Town, is bright and showy, but full of what is technically termed ‘stick’ or ‘kempy’ hair. Beybazar, or Princes Market, is so near Angora, that the mohair it produces has no marked points of difference. The ram is larger in size, very heavy, and stands a sea voyage well. A few have recently been imported to Cape Colony and California, the result in both instances being highly satisfactory. Tchukess (or ‘Circassian village’) and Geredeh (or ‘behind the mountain’), two districts where the mohair goat has been introduced in

* British Vice-Consul at Angora, in a paper read before the Royal Colonial Institute at Port Elizabeth.

comparatively recent times, and where, although stocked from other districts, they develop distinct characteristics owing to the difference of climate and elevation. The Gerekeh ram is a large and powerful animal, covered with a fleece that seems almost black, so surcharged is it with grease; but when scoured the mohair is found to be second to none in quality and fineness. . . . The fleece of the Komah variety is reddish brown, and though this reduces its value as mohair, it is sought after for certain special manufactures. On the frontier of Armenia and Mesopotamia, and far to the eastward of this district, is a province called Van, which has hitherto supplied a great weight of inferior mohair, more resembling sheep's wool than goat hair." This account, coming as it does from one who has had such experience as Mr. Gatheral, is of the greatest interest, as no one has probably had such opportunities for obtaining accurate information on this subject.

Besides the difference in the quality and colour of the fleece, however, there is considerable diversity in other external features of the Angora. Thus the ears vary both in length and degree of pendulosity, the greater part being semi-pendulous, but in some more horizontally inclined. The horns too, equally differ, many being nearly perpendicular, with a slight spiral, others showing a lateral growth with a distinct twist, whilst here and there they are met with growing back over the head with a slight inclination in an outward direction towards the extremities. These variations are due in great measure to crosses more or less remote with a common kind known as the Kurd race, which is distributed generally over Asia Minor. It is a black goat, rather larger than the white or Angora proper, the hair of which, although long and of a fleecy nature, is perfectly straight without curl, being at the same time coarse in quality. Crosses with this variety are not unfrequently made, the object being to gain hardiness, the purity being restored, it is stated, after the third generation.

In the spring of 1879 a valuable herd of 30 pure Angoras procured from Asia Minor at a cost of over £1000, were transhipped at the Victoria Docks on their way to Port Elizabeth from Constantinople. Through the kindness of the importer, Mr. J. B. Evans, whom I shall have occasion to mention again presently, an opportunity was afforded me of inspecting these goats, besides being made acquainted with the correct points of the breed according to the judgment of the professional stock-breeder. These are as follows:—

Points:— Head fine, with the fleece growing well over the forehead, ears wide, thin, and pendulous, not long and hanging down direct from the head, but standing out and then lopping over, more resembling the ears of a mastiff on the alert, and best described perhaps as semi-pendent. The horns are flat-shaped; they should be set far apart on the head, and taper gradually towards the tips. Their direction depends on the sex. In the male they should incline first to the rear, with a slight twist outward, and the ends pointing upwards. In the female, on the contrary, they take a lateral direction, the spiral being more decided, and the extremities pointing downward. The chief feature, however, necessarily consists in the length, texture, and character of the fleece, which should be as free from anything like hair as possible. In the best specimens it is of a fine silky nature, growing in thickly-matted flakes near the skin, and then separating into long corkscrew-shaped ringlets, covering the whole animal as far as the hocks.

It is this material which is known commercially as mohair, and which is shorn off every spring for manufacture into fabrics. If not removed in this way it falls off naturally as the summer approaches. Besides this fleecy covering, however, there is an undergrowth of ordinary hair which is very short, and lies close to the skin, being no doubt intended by nature as an additional protection against cold when it sheds its outer coat. In common kinds the average weight of fleece in a herd, reckoning full-grown

goats and kids, is about $2\frac{1}{2}$ lbs., but in the best breeds it attains an average of 6 lbs. The greatest weight is taken from the rams, which shear as much as 10 and 12 lbs. each; those that are castrated, and between two and four years old, producing the finest quality. The length of the strands is about 8 inches.

Suitable Climatic Conditions :—The Angora stands cold well, providing the climate is a perfectly dry one. In a communication to Dr. Hayes,* Sir Samuel Wilson, whose experience in the breeding of Angoras under varying conditions is very considerable, states that “a dry and moderately warm climate suits the Angora best; but altitude is of less importance. I have kept them in plains 500 feet above the sea, with an annual rainfall of 18 inches, and a warm climate with no snow and little frost, and they succeeded admirably. Also 1800 feet above the sea, in a latitude colder by three degrees than the above, where the rainfall is 27 inches, and they did not do so well. Finally, at 1200 feet elevation, on open bare plains, without snow in winter, or very rare, and they do fairly well; but it is a little too cold. The rainfall there is 25 inches.”

Introduction into other Countries :—The great increase in the demand for mohair of late years has led to various attempts being made to breed the Angora in other countries besides Asia Minor. This has been done in the United States, Texas, California, Australia, and Cape Colony. In Texas the attempt has been made with some good results, as also in California, where pure stock was first imported from Asia Minor in 1861; in neither of these countries, however, can it be regarded generally as a commercial success. Regarding California, it is stated that though the appearance of the animal is prepossessing, and the wool commands a high price in the market, the yield is not sufficient to pay the interest on the cost and the expense of the keep.

* Author of ‘The Angora Goat, its Origin, Culture, and Products’ (1882).

In the United States the first importation was made in 1848, by Dr. J. B. Davis, who at the time was U.S. Consul in Turkey. Since then some hundreds have been introduced and bred in herds by skilled agriculturists, one of the most prominent being Colonel R. Peters of Atlanta, who after an experience extending over many years, regards these animals as a valuable acquisition to the resources of the country. From this remark, and considering the known go-a-head, enterprising character of the Yankees, who use mohair in enormous quantities, one would have expected to have seen the Angora ere this as completely established in America as the sheep; but such is not the case.

In the Antipodes the first importation was made in 1853, by the Acclimation Society of Australia, the goats being located in the Royal Park at Melbourne. These answered so well that in 1866 a further importation of ninety-three head was made, and the whole flourished and increased amazingly. In 1870, however, a large proportion of the herd was sold, and specimens distributed over the country, besides a few being sent to neighbouring colonies. A select lot were transferred to the care of Sir Samuel Wilson, at Elcidoun, where the herd is, I believe, still in a flourishing condition.

As far as commercial results are concerned, in no country has the introduction of the mohair goat met with so much success as at the Cape, where the raw material is now produced in such large quantities as to form an important item in the resources of that colony. To give an idea of the rapid increase in the production, I extract the following figures from the official returns of imports into England.

In 1865 (the first year)	6,804 lbs.	value	£359
„ 1875	1,122,759 „	„	£131,550
„ 1883	4,443,971 „	„	—

The first attempt was made here in 1857, when a few pure-bred rams were introduced and crossed for want of a sufficient number of pure ewes, with the indigenous Cape goat (a lop-eared

variety, in many respects resembling the Nubian). These half-breeds produced a coarse kind of mohair, which although fit for little else than stuffing saddles, proved sufficiently saleable to encourage the experiment on a larger scale, and a further importation from Asia Minor was accordingly undertaken. This second venture, consisting of six rams and one ewe, met with marked success ; the animals were offered for sale by auction, and realised high prices, one ram fetching £100, and the other £117. Their progeny, however, soon became scattered far and wide, and being crossed with native goats without proper judgment, the purity of the breed greatly deteriorated. Later importations greatly improved matters, which was clearly evidenced by the higher prices obtained for the clips in the English market. This circumstance encouraged Mr. J. B. Evans, acting as manager to the Cape Stock Farming Company, to undertake a journey into Asia Minor, and to penetrate into the heart of the Angora breeding district, there to select the finest stock that could be obtained for money. The result of his purchase has already been alluded to ; but to show the superiority of these animals, and the high value that was set upon them on the arrival of twenty out of the original thirty head which he succeeded in landing at the Cape, I may mention that five of the rams realised, when sold by auction, an aggregate of £1755, their respective prices being £240, £270, £395, £400, and £450. The goat which attained this last remarkable figure is the subject of the illustration (Plate VI.), and being drawn from a photograph of the animal taken in full fleece, just previous to its embarkation at Constantinople, may be regarded as a perfect type of the breed.

Experiments with the Angora Goat in England.—The experiment has been tried both in this country and in France of breeding the Angora for its fleece, but it has never been carried on with any great success, neither the soil nor the climate being suitable ; for though the animals have lived and

even thrived the quality of the mohair has deteriorated. The most recent experiment in England was attempted by the late Duke of Wellington, who in 1881 imported from the Cape a herd of some half-a-dozen, which he placed in his park at Strathfieldsaye, near Reading. For the first six months these animals seemed to thrive well, and a good clip was secured, but as the winter season came on several died, and by the following spring the herd was very much reduced in numbers. This was doubtless owing to want of proper management, there being no one who understood their requirements. Later on, however, this difficulty was to a great extent remedied, and the goats again increased and multiplied, till at the Duke's death there were about five-and-twenty, including kids. From these animals a good quantity of fleece was collected, though the quality was coarser than that obtained from either Asia Minor or the Cape. It served, however, for manufacture into a coarse kind of cloth, being mixed with the hair from some llamas, also kept on the estate. Many of the clothes worn by the late Duke were made of this mixture, and I myself possess an overcoat cut from the same stuff, presented to me by his Grace, which promises to be everlasting as regards wear. The Strathfieldsaye herd was in February of the present year (1885) sold by auction, when I took the opportunity of securing two couples of young stock, which during the few months I have had them in my possession have done well. I may here mention that I had over from the Cape in 1881, at the same time as those imported by the Duke, a very fine Angora buck (a present from Mr. Evans), which I intended to have crossed with our short-haired English breed in order to obtain, if possible, a variety that would produce in one and the same animal milk, meat, and fleece. This goat was exhibited, shortly after its arrival, at the Alexandra Palace Show, and figured in the engraving of prize-winners in the 'Illustrated London News.' Unfortunately it did not live long enough to enable me to carry out my

intention. Of the three females that were in kid by him two slipped their young prematurely, and the other died from a disease that decimated my herd the following winter, and to which the Angora itself fell subsequently a victim. Another she-goat, however, which belonged to W. Hucks Gibbs, Esq., Elstree, Herts, produced two kids by this imported ram, one of which, showing all its sire's characteristics, still lives, I believe.

My own experience, comparatively short though it has been, combined with the results I have seen obtained by others, as related above, leads me to the belief that the Angora goat by proper housing and judicious management will live and thrive in this country, though the climatic conditions are not favourable to the growth of fleece equal in quality to that imported. Nevertheless I believe it would be good enough for many purposes to which inferior mohair from abroad is now applied.

Feeding and Treatment :—As far as I have seen, I do not find that the Angora requires different feeding or treatment to other goats. They do well stall-fed, providing they are housed in a *dry* place, but though like all the goat species they are fond of a change to leaves of trees and brambles, they are well adapted to pasturage, and less mischievous and addicted to roaming than the common goat. Although, as shown further on, they are said to object to rain, I have seen them in the park at Strathfieldsaye grazing in a herd by themselves, under a downpour of rain that would have caused any other kind of goat to seek shelter.

The Angora has seldom more than one kid at a birth, and is not a good milker, rarely giving more than a quart a day, sometimes less, though the milk seems more concentrated. At kidding-time they require some extra attention, it being often necessary to put the kid several times to the dam to get it to suck. If the weather be cold and the kid is weakly, it will require to be brought into the house and placed before the fire, and a few drops of warm milk from the goat put into its mouth. Once it

takes to the teat, however, it is able to look after itself. The young of the Angora grow more rapidly than those of the common goat, though the increased size which the former present comparatively with the latter at the same age, is partly due to the fleece they carry giving them a larger appearance.

Shearing in this country should be done towards the end of April or the beginning of May, as early in fact as the weather will permit, otherwise the fleece falls naturally, coming off on everything that the goat rubs against, and thus being lost.

In order to give my readers the benefit of experience wider than my own on this particular branch of goat-keeping, I will quote from Dr. Hayes' book some remarks made by large Angora breeders in America, that give some additional information on the treatment of the Angora :

"Colonel Peters states, that one shepherd with a good dog can readily attend one thousand head of goats during the summer months. They may be kept with sheep to great advantage : that is, in the same range, for they do not graze with the sheep, being more active and rapid in their movements. Feeding on leaves, weeds, and briars, they prepare the land for sheep, and do not lessen the number of the latter already kept in a flock. Under this arrangement the cost of attendance is very trifling, for they require very little attention, except at the time of bringing forth kids ; and their habit of returning home every evening is a very valuable trait.

"The bucks come in season about the 1st of August, and can be relied upon for good service until the month of February. Ewes come on heat during September. Young ewes with their first kids require to be kept in an enclosure, so as to prevent them deserting the kid."

THE CASHMERE OR "SHAWL" GOAT.

There are several varieties of this goat, but the true Cashmere is the goat of Thibet, which is met with generally between the

principal and secondary ranges of the Himalayas, near the regions of perpetual snow.

It is popularly supposed, both in this country and in the United States, that the Cashmere is identical with the Angora, but this is quite a mistake. Some naturalists, I believe, regard it as descended from the same wild goat, *i. e.* *Capra Falconeri*, which may not be improbable, seeing that this animal frequented the mountains of Thibet, and that both domestic breeds are wool-bearers. Beyond this, however, the two goats have little in common, and even in regard to their fleece there is an important distinction, for whilst in the Angora it is the outer covering that is of a woolly nature and manufactured, in the Cashmere it is the undergrowth which is fleecy and utilised in commerce, the outer covering being hair like in the common breeds, and comparatively valueless. In many respects, indeed, the Cashmere presents a much stronger resemblance to our own goats than to the Angora. It is a rather small race, with hair measuring from 4 to 5 in. in length, generally white, with sometimes reddish patches on the neck and shoulders. Of the two French writers I have already referred to, one classifies them amongst the breeds having long semi-pendulous ears, whilst the other, although giving them a similar description, supplies an illustration wherein the animal is depicted with perfectly upright ears. The only pure specimens I have been able to meet with were those on view at the Zoological Gardens in 1877 and subsequently, the former being among the collection of animals brought over by H.R.H. the Prince of Wales from India. As these were presented by some Indian potentate, it may be reasonably presumed they were pure bred, and represented the true type, more especially as their appearance corresponded with that of the others placed in the gardens four years after, one of which is still on view with some Angoras. These specimens were small, with horizontally inclined ears and curled horns, inclining at their extremities to the rear. A contributor to the 'American



Agriculturist' some years ago described an imported she-goat of this breed as "smaller than the Angora, narrow in the chest, with fox ears and rather short upright spiral horns. As, however, nearly all the Indian varieties of the goat have pendulous or semi-pendulous ears, it is highly probable that some varieties of the Cashmere possess the same peculiarity.

The points are a short fine head, thin ears, small bones, delicate skin, and a long, heavy coat; the longer the hair, the more abundant the fine undergrowth it covers. This undergrowth consists of a beautifully soft downy wool, more fleecy in its nature than mohair, very short, and of a white or greyish-white colour. It grows at the roots of the long hair, appearing in the autumn, and being shed in the spring, when it is collected by a very careful combing process, which occupies from eight to ten days. This is a work of great patience, as it requires to be carefully separated from the hair, that becomes detached in the operation and accumulates on the comb. The quantity obtained even in the best specimens only amounts to about half a pound, whilst in inferior stock it varies from 4oz. to 6oz. It ranges in price from 5s. to 6s. per pound.

As may be supposed from the great elevation at which these animals pasture on their native mountains, they can endure a considerable amount of cold; they are, in fact, a particularly hardy breed as long as they are kept in a dry climate; but a damp locality kills them. Attempts have been made both in England and France to acclimatise them, but with indifferent results. As early as 1816 Baron Fernaux and M. Joubert introduced a herd of nearly 400 head into France, some of which under favourable circumstances are stated to have thrived well enough, but their fleeces degenerated in quality, the material obtained from each individual being at the same time exceedingly small. A portion of this herd was purchased by Mr. C. T. Tower, an English gentleman, who happened to be in Paris at the time they arrived, and who removed them to his park at

Weald Hall, near Brentwood in Essex. Here they are reported to have flourished sufficiently well to enable the owner to have a shawl made from their fleece, which was pronounced by competent judges to be of very fair quality. At the death of Mr. Tower the herd was transferred to Windsor Park. It is probably to these goats that Sir Samuel Wilson refers in the following interesting account, which I transcribe from his work on the Angora :

“ The late Prince Albert had a small flock of the pure Cashmere goats at Windsor. Desiring to have some fabrics manufactured from the fleece, a quantity of the wool and hair as it was shorn from the goats was sent to a large manufacturer. The separation of the wool from the hair being at that time, from the imperfection of the machinery in use, a very difficult operation, a great number of ladies assisted the manufacturer by taking small portions of the fleece and picking by hand the wool from the hair. Such was the enthusiasm caused by the experiment, that over a thousand persons, of all grades and conditions, were employed in the work. Each person so employed received as remuneration an elegantly-engraved certificate, stating that the holder had assisted in bringing to a successful result the experiment of His Royal Highness in the manufacture of Cashmere goat’s wool. Some brocades and two beautiful shawls were produced by Messrs. Haley the manufacturers, and the hair was made into a coarse fabric, which was shown in contrast with the finer textures.”

CHAPTER V.

SELECTING A MILCH GOAT.

POINTS OF A GOOD MILKER.

THERE are certain points by which a good milch goat may generally be recognised, and which may here be mentioned as a guide to the purchaser, in case he may not have experience in these animals. A good milker has a neat, delicate-looking head, broad at the forehead, and tapering towards the muzzle, with horns (if any) fine (thin) and tapering; but a goat entirely devoid of these appendages is, in my estimation, preferable. The eye should be large and bright, and the expression of the face thoroughly feminine; this is an important point, though many people might not suppose it; a thick-headed "billy-faced" animal, with large coarse horns and a masculine appearance, being rarely good for much. The principal features, however, consist in the shape of the body, and in the udder and teats. Always look for a goat with a large deep body and ribs well rounded, so that there is plenty of room for a big stomach; a heavy milker is generally wedge-shaped, that is to say, it is much wider at the hind quarters than at the chest; also deeper behind than in front. A broad chest is an indication of a tendency to accumulate meat and fat rather than milk, though it is also a sign of a good constitution. I never, however, regard a narrow chest in a milch goat as a defect, providing that it makes up for it by being wide behind. The best milkers are generally narrow-chested, with long thin necks,

meagre bodies, and protruding hip-bones. Thinness is no drawback if the animal is a good feeder. The food must be transformed into something, and if a goat eats largely without getting fat, supposing the creature to be in health and milking, it must go to supply the mammary gland. Another point is the skin ; this should be loose and delicate, with hair rather soft and fine in quality, but not too abundant. Now as regards the udder, which is so often deceptive in appearance. Let no one be attracted merely by the *size* of the bag, independent of other considerations. A goat may have an immense udder and yet give a comparatively small yield, for the simple reason that it is all flesh instead of all milk. It should not only be large, but thin in substance, and soft and elastic to the touch. When quite full it will be greatly distended, but after milking it should shrink up to a very much smaller size. Thus a goat which, when in profit, has a large udder, when she becomes in course of time dry will exhibit very little.

The teats should be situated far apart from each other, and point outwards, the nicest being those that taper, and of a size easily grasped in the palm. The udder should by preference be set well forward, and be round rather than long and narrow, though it must be admitted that many heavy milkers possess bags of the latter shape.

Colour is a matter, in my opinion, of little or no importance as regards the yield of milk ; black goats are often considered the best, but I cannot say that I have found these preferable to any other.

The type of animal I have endeavoured to picture is thoroughly illustrated in the Swiss goat "Linda" already described, which possesses all or nearly all the features mentioned in an eminent degree.

Another important consideration when choosing a goat, is the age.

INDICATION OF AGE.

The best age is between two and three years, after it has just borne its second kids, as the amount of milk given on the first occasion is comparatively small. If the goat has not arrived at her second year, being then with her second litter, she must have had her first kids at too early an age, and before her growth was fully developed, so that she would be stunted in size in consequence. A pretty accurate estimate of the age of a goat may be obtained by looking into its mouth and examining the teeth; like sheep and cows, these animals have no incisors in the upper jaw, but only in the lower, it being by these that the age is to be ascertained. The mouth of a goat aged one year contains its full complement of teeth, thirty-two in number—namely, six molars on either side of each jaw, and eight incisors, or front teeth, in the lower jaw only. These are of small size, and rather pointed. In the second year (generally about the second month) the two centre ones fall, and are replaced by two new ones, which are easily distinguishable by their size, being considerably larger than the other six. In the third year two more small teeth, one on each side of those already changed, are replaced, so that at that age there are four large incisors in the centre and two small ones at each end. In the fourth year the large teeth increase to six in number, and only two small ones, one at each end, remain. Finally, when the goat reaches her fifth year, these in their turn fall, and are replaced, and she has then what is commonly called a "full mouth." After that time the means of ascertaining the age are less sure, the only plan then being to examine all the teeth generally, but particularly the molars or grinders, the more these are worn the older the animal may be presumed to be. At seven or eight years the front teeth begin to break and fall out without being replaced, so that a goat with one or more incisors missing, the rest being worn and

broken, may be fairly assumed to be old and nearly useless, and should therefore be rejected.

I should state, however, that although these remarks apply generally for distinguishing the age of a goat, there are so many exceptions that it cannot be always implicitly relied on. The precise age at which the teeth are changed varies greatly according to the conditions under which the animal has been reared, whilst the amount of wear and tear they have undergone after the "full mouth" stage is reached depends upon the usage they have been subjected to. If a kid has been forced by high feeding, its teeth are changed earlier than if reared less artificially, and sometimes even when the first pair fall after a year old, the second pair will follow within a few months, the rest being rapidly changed in succession. Instances of this kind are clearly shown in the following table which are records of careful observations on this point.

GOAT No. 1.			GOAT No. 2.			GOAT No. 3.		
No. of large Incisors.	Age at which they appeared.		No. of large Incisors.	Age at which they appeared.		No. of large Incisors.	Age at which they appeared.	
	Years.	Months.		Years.	Months.		Years.	Months.
2	1	2	2	1	2	2	1	1
3	...	...	3	1	7	3	1	10
4	1	11	4	1	8	4	1	1
5	2	8	5	2	...	5	...	...
6	2	5½	6	2	...	6	2	3
7			7	2	3	7	...	...

Goats that have done much browsing are sure to have their teeth more worn down than those which have been stall-fed, the latter using their molars more than their incisors.

INDICATION OF HEALTH.

Another matter which should not be overlooked in selecting a goat is its health; nothing is more disheartening than when buying an animal of any kind which you imagine to be in

perfect condition, to find it in a dying state, perhaps a day or so after. In my youthful experience of rabbit-keeping I recollect such a thing was of frequent occurrence, and although goats are not subject to the same diseases as rabbits, and are as a rule healthy creatures, still, to avoid anything of the sort—as there are always unscrupulous persons ready to take advantage of the uninitiated—it may be useful to many of my readers to know how to detect a goat in health or sickness. When ill, these animals have a mournful, dejected appearance, their breath is offensive, and their gums of a pale colour; their appetite is bad, and they lose generally that vivacity and sprightliness of manner which are so characteristic of them when well. When in good health, on the contrary, they carry their head erect, their eyes are bright and sparkling, with a cheerful expression, their nose dry and nostrils moist; their breath is sweet, and their mouth and gums a bright red. Another sign by which their condition may be known is the vein of the eye. This may be examined by raising the upper lid with one thumb and pulling down the lower lid with the other. If the vein in the corner of the eye be a bright red colour, the goat may be considered to be in good health.

ADVICE AT STARTING.

In buying a goat, as in buying a horse, some experience and judgment are absolutely necessary to prevent a person from being defrauded, more especially if it be desired to have one that will shortly kid, as these animals have often the appearance of being in an interesting condition when, in fact, they are nothing of the kind, the resemblance being caused by a surfeit of green food, especially if eaten wet. Again, as regards the quantity of milk they are said to give, unless the seller be a trustworthy person, whose word and honour may be relied on, it is best not to take for granted that "she gives two

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quarts a-day," as you may be very likely told ; or you will, in all probability, after having paid your money and milked your goat, find she gives barely one. Having, in my early experience of goat-keeping, suffered all these disappointments, these few words of caution may be useful to prevent others from being taken in. In selecting a goat in kid, therefore, it is advisable to buy of some one whom you can trust ; but if the seller be a stranger, and you have no friend on whose knowledge you can rely to assist you, enlist the services of your milkman, who will, in all probability, be able to give you useful advice. In all cases I would recommend an intending purchaser to see the animal milked twice, if possible, before paying his money ; there will then be no doubt about the quantity given.

Considerable advantage may be derived by keeping two goats instead of one, the amount of time and trouble required being scarcely any greater, whereas the profit derived is more than double. The best plan is to begin by purchasing one that has just kidded, and when that is becoming dry, to procure another just about to kid, by this means a good supply of milk will be always kept up.

As some goats are spiteful and bad-tempered, and consequently troublesome, especially at first, to milk, if those who will have the care of them are women or children, it would be best to begin by purchasing a young female kid about six months old, always supposing, of course, that you are not in immediate want of the milk, and can afford to wait a year before she becomes productive ; by doing this you get an animal which will soon, by kindness and good keeping, become as tame and docile as a lamb, being almost as much attached to its master or mistress as a dog. In such a case it is more than ever necessary to buy from some one on whom you can rely, it being essential to ascertain the respective qualities of the parents. Endeavour to obtain one whose sire and dam come of good milking stock, possessing quiet, even tempers ; an unprepossessing-looking

animal, with a good pedigree, being far more useful than never such a handsome one without.

PRICES OF GOATS.

It may not, perhaps, be out of place, in concluding my remarks on this head, to state the various prices which should be paid for goats of different qualities in England: a large well-bred English goat from two to four years old, in full milk, giving two quarts a day, is worth from £2 10s. to £3 10s. If she give a greater quantity, the price may be expected to be more in proportion; if less, I should consider £2 5s. sufficient. Any goat giving two quarts is well worth £3, be she large or small. When dry, a similar animal would fetch 10s. or 15s. less; from 35s. to £2 is about the average price for an ordinary goat giving two or three pints a day. An ordinary kid, at six months old, usually fetches 10s. or 12s., but if well bred from superior stock is worth from 15s. to £1. It must, of course, be understood that prices vary according to circumstances, such as age, breed, parentage, &c., and especially according to the time of year, milking goats being much dearer during autumn and winter. It is therefore impossible to state the exact value of any animal, without knowing its individual qualities and other particulars.

CHAPTER VI.

THE GOAT-HOUSE.

THOSE contemplating keeping goats will find the interest they take in their management more than doubly increased if they have a clean and comfortable place in which to attend to them. Persons having an empty stable need of course no further accommodation, and only require to make the necessary alteration in the position of the manger or feeding-boxes, to suit the height of the animals, and the thing is done. There are few residences that have not some kind of outbuilding, which, with a little contriving, could be made into a comfortable goat-house of a more or less substantial character; but to those who have not such advantages, and are obliged to construct one for themselves, the following hints to guide them will be serviceable.

The cheapest form of building will be a "lean-to," advantage being taken of the angle of a wall to erect it against, if such presents itself; by so doing extra shelter and warmth, besides a saving of material, will be effected. The dimensions I am about to give will easily accommodate two goats, the cost of making being little more than for one, and I have already shown the advantage to be gained by keeping a pair. Even should a single animal be the intended inmate, the increased space afforded will be found advantageous if an addition to the stock takes place, or when the kids make their appearance. The building should be 5ft. wide by 7ft. long, the length being divided as follows: 1ft. for the width of the manger, 4ft. for

the length of the goat, and 2ft. for a passage to contain the few implements required for use in the stable. The height nearest the wall should be 7ft. 6in., the opposite side being 5ft. 6in., which gives a slope of 2ft. to the roof; this may be either tiled or made with wood, over which is laid a covering of felt. The latter plan is certainly the warmer as well as the cheaper of the two, besides being lasting, for good felt properly tarred when laid down, and retarred every second or third year, will stand nearly twenty years.

In constructing a building that is intended for the habitation of animals, great attention must be paid to one important point, viz., ventilation, without due regard to which no creature, however hardy, is free from the attacks of disease in some form or other. Means must therefore be provided to allow the escape of the heated foul air, admitting at the same time a corresponding amount of pure air to take its place. Care must be taken, however, to avoid any direct draught upon the goats, which would have an injurious effect, for although fairly hardy as a rule, they are sensitive to cold. Various means may be adopted for ventilating the house, such as the use of air bricks or louvre boards; but in a building the nature and size of which I have described, nothing will be found easier to fix, cheaper or better, than pieces of perforated zinc, which should be placed in the highest part of the stable, just under the roof, another piece being inserted at the lower part, a few inches from the floor just below the manger, thus causing an almost imperceptible current of fresh air to be admitted close under the animals' nostrils.

A good-sized door about $2\frac{1}{2}$ ft. wide running up to the roof will be required. The best are those which are known as half-doors, so that in fine weather the top door can be left open when the other is shut. A window is also necessary to admit light and air. One that opens by turning on a pivot in the centre will be found as cheap as any in construction, besides being easily opened and shut.

For the floor the best material is concrete ; it is cheaper than bricks, and being of a hard and smooth surface, is easier to clean. Care must be taken when laying it down to allow full time for the cement to set before it is trodden on ; about twelve hours is sufficient for this as a rule, but in a damp place it will take two or three days before it becomes thoroughly dry and hard throughout. The floor must be raised about $2\frac{1}{2}$ in. from the level of the ground outside, to prevent the wet from entering under the door ; it should also slope gradually from the manger to the entrance, which will be found of great assistance when flushing it with water, which requires to be done occasionally in summer. A small quantity of Condyl's fluid mixed with the water for flushing is valuable in deodorising and purifying the place.

If only one goat is kept, it may be allowed to run loose in its house, and a good plan then is to fix a bench against the wall about two or three feet from the ground. It will prefer this to lie on to any quantity of straw or other bedding placed for it upon the floor, and it is indeed better, especially if the floor be of a damp nature. Instead of providing a manger or trough to receive its food, it is better to have a plain board, 11 in. wide and 1 in. thick, in which two circular holes are cut sufficiently large to take a small galvanised iron pail, let down to within a couple of inches of the level of the board, which should be from 20 in. to 24 in. from the floor, according to the height of the goat, and supported on wood or iron brackets fixed to the wall. These pails, one of which is for water and the other for food, are much better than a manger, wherein refuse food accumulates and turns sour ; for the pails can be readily removed to be filled, and any un-eaten contents that may remain tipped out. At the same time, from the secure manner in which they are placed, the goat cannot upset them or waste the food by nosing about for the bits it most fancies, and turning out the rest. A small hay-rack, as shown at Fig. 1, can be placed a couple of feet or so above,

so that there is not sufficient space for the animal to jump up and stand on the board, as it will otherwise be sure to do if loose.

When there are several goats, and especially when a he-goat is amongst them, it is most important that they should be all securely fastened up, and it is still better to provide a little stall for each, by erecting partitions at intervals along the feeding-board. These partitions need not, however, extend more than

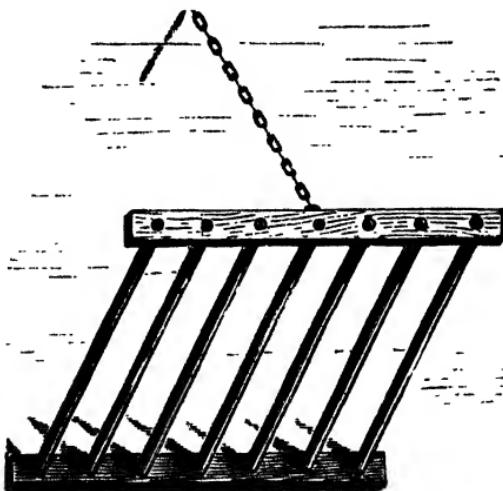


FIG. 1.—HAY-RACK.

half the length of the animals' bodies, being merely required to prevent their fighting and interfering with each other whilst feeding. When this is not done, even supposing they are separated too far to do any actual damage, the attempts that are made by the stronger and more ill-tempered ones to interfere with their weaker and more nervous neighbours prevents the latter from feeding in peace. I much prefer in this case to place the stalls and feeding-boards away from the wall, so that food may be given them from the front. This I find greatly facilitates the operations.

It may, perhaps, be interesting if I give a description of the

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stalls in my own goat-house, with instructions how to fix them, so that those who may desire to imitate my plan and be their own carpenters can do so.

GOAT STALLS.

These are of various widths, to take different-sized goats, but the dimensions I would recommend generally are 2ft. for small she-goats and 2ft. 3in. for large full-grown animals. If

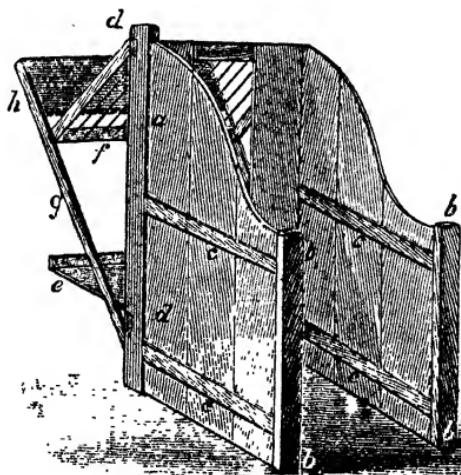


FIG. 2.—BACK VIEW OF GOAT-STALL.

the stalls are wider the goats are able to turn round, which is very objectionable, as they soil the front and sides. Besides this, the extra space enables them to make use of their horns against the divisions, which they will do very freely if they happen to have a neighbour they dislike, or if a new goat be placed next them. I will give in detail a description of one stall, whereby any number can be made that are required, it being merely a question of space and timber. The accompanying illustrations (Figs. 2 and 3) will assist the reader to understand my directions:

Procure some quartering, 3in. by 2 $\frac{1}{4}$ in., and cut two lengths of 4ft-6in., two of 3ft., and four of 2ft. The first are for the front posts (*a*), the second for the rear posts (*b*), and the third for cross rails (*c*), connecting the two posts together, which can best be accomplished by cutting mortices in the posts at distances of 1ft. 6in. and 3ft. respectively from one end, and making tenons at the ends of the rails to fit them. When thus connected they form the framework of the two divisions, which only require

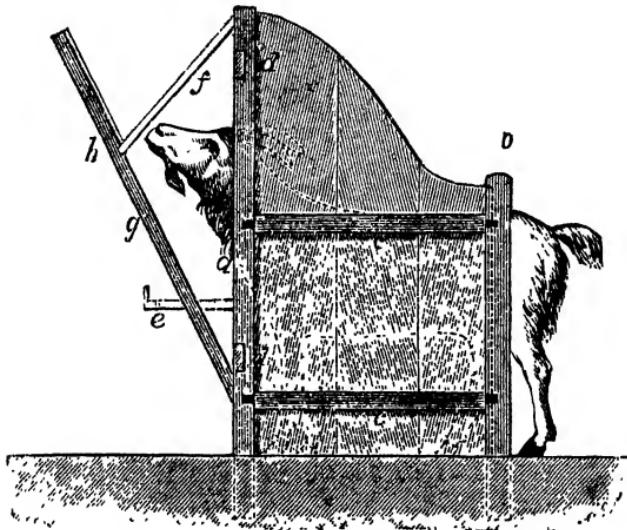


FIG. 3.—SIDE VIEW OF GOAT-STALL.

boarding up to be complete. Matched boards are the best to use, as they fit closer and look better; they should be 1in. thick, and shaped at the top after the fashion of the stalls in ordinary stables, as shown in the sketch. To make a proper job the cross rails should be rather narrower than the posts, so that when the boards are nailed on they come flush with them. When the partitions are erected the posts should be let into the ground about six inches to give them strength and firmness. Two pieces of quartering are then nailed horizontally along the front of the stalls, either upon them as they are, or, what is

better, let in by cutting a piece out of the post and a corresponding portion out of the rail to fit, known as a "half-lap," so that they do not project beyond the posts. These rails (shown in section at *d d*, Figs. 1 and 2) are placed, one 15in., and the other 3ft. 6in. from the ground. If, as is likely to be the case, the end stall is against the wall, these cross rails should be let into the latter by knocking out a couple of bricks; this will make the partitions firmer. I find it best to keep the billy in this end stall, as he requires an extra strong compartment. The front of the stalls can then be boarded up in the same way as the sides, but leaving a space of 9in. for the head of the goat to pass when feeding. The boards must be nailed from the inside, otherwise an obstreperous goat, especially if a male, will be likely to butt against them and start the nails, which cannot, however, be done when they are backed by the cross rails.

The next operation is to provide the feeding-board mentioned before, and to cut circular holes in it, opposite the openings in the stalls, to receive the feeding-pails. This board (*e*) rests on brackets, either iron or wooden, screwed against the posts at the necessary distances. When the stalls are away from the front wall a rail should be nailed along the edge to prevent anything like lumps of rock salt or whole roots falling off. All that now remains to be done is to fix the hay-rack. This (*f*) I need not describe beyond giving the dimensions. I may, however, state that I use iron rods, $\frac{3}{8}$ ths of an inch thick, placed 1 $\frac{1}{2}$ in. apart, in preference to the ordinary wooden bars. The width of the rack should be 18in., the length, of course, depending on the number of stalls. When these are placed against the wall the lower part of the rack will be fixed against it, but if there is a passage between to allow of feeding in front, according to my own plan, some support is necessary. This may be obtained by nailing a length of wood obliquely, as shown in the sketch at *g*, and fastening the rack against it. The part above, where it joins the rack (*h*), is boarded lengthwise with a couple of thin

boards, which extend the whole length, and serve to form, with the rack, a kind of trough to hold the hay. My reason for placing the rack outside the stalls instead of in, is to avoid the waste that takes place with the hay when the rack is situated over the animals' heads, owing to portions falling at their feet, and being trodden on. When placed outside, whatever may fall whilst pulled out drops on to the board and in the pails, and is subsequently eaten, being then unsoiled.'

Fastenings for Stalls.—For fastening up the goats a staple may be driven about the centre of the stall, and 12in. from the ground, but what is better is an iron rod 2ft. long and not quite $\frac{1}{2}$ in. in diameter, bent at right angles at each end, as shown in the woodcut (Fig. 4); the ends being pointed or wedge-shaped, are driven into the wall or partition, the lower to within an inch, and the upper within three inches of the angle of the iron, thus giving the rod an oblique position. Into this rod, instead of the staple, the spring-hook connected with the goat's collar can be slipped, it having this advantage over the latter, viz. that, instead of being fixed, and therefore curtailing the distance when the animal stands up to feed, the hook, as soon as the goat tightens its chain, slides up the inclined rod and gives it the same length as when lying down. Where any difficulty is experienced in obtaining a bar of iron, an ordinary iron curtain-rod answers the purpose very well, the trouble of bending it being avoided by driving a long eye at the top, and a short one at the bottom, and fixing it to the wall in that way.

There is yet another plan, closely resembling the above, but considerably stronger, and one which I should recommend for

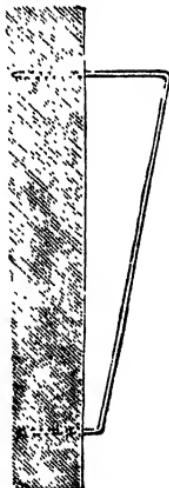
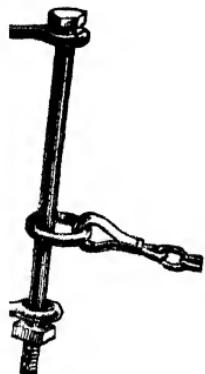


FIG. 4.—FASTENING IRON.

large and powerful goats; it consists of an ordinary screw-bolt



(Fig. 5) dropped into a couple of screw eyes and secured on the other side by a nut, a ring having been previously slipped over the bolt to slide up and down; this I prefer to the bent rod, as it is stronger and more easily removed when required. These screws are best inserted in one of the *front* boards of the stall, within an inch of the opening admitting the goat's head, the bottom screw being placed about 12in. from the ground. It is necessary for the goat to be fastened as

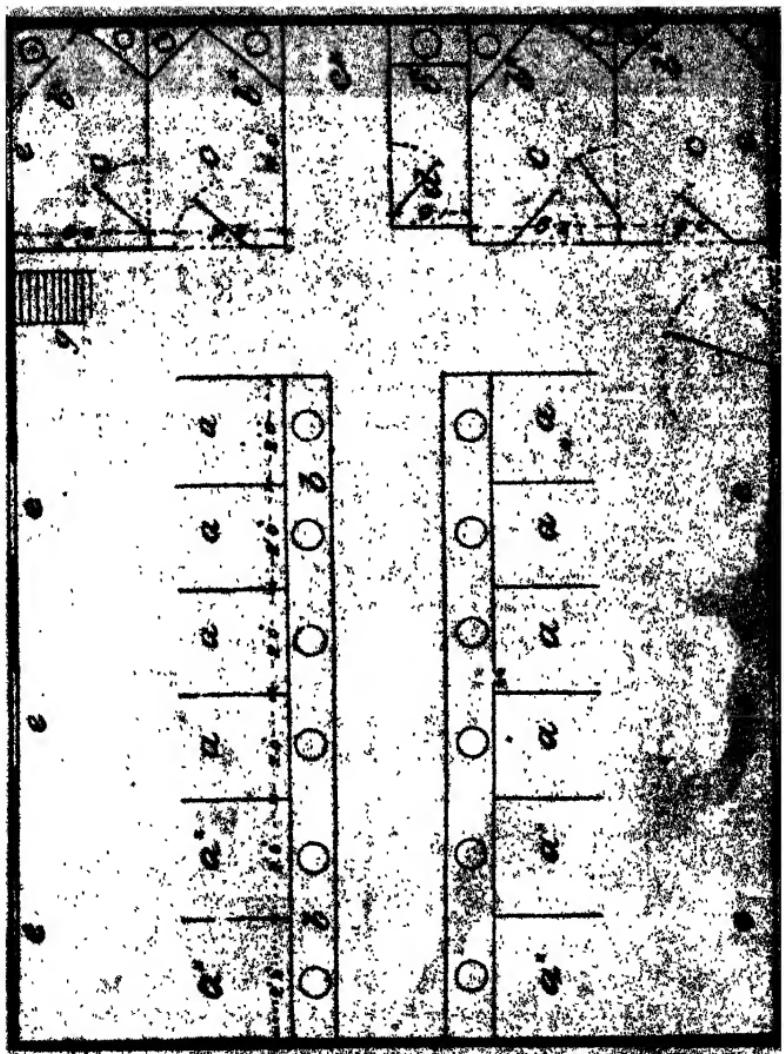
FIG. 5.—BOLT TO WHICH GOAT MAY BE CHAINED. near to the centre as possible, to prevent her turning round. For the same

reason the chain and spring hook attached to the collar should not exceed 10in. in length.

Those who wish to carry out the work at as cheap a rate as possible should purchase some empty American ham-cases sold at 10d. each, by wholesale provision merchants. The boards of which these are made are just the right height and thickness, and, being "matched," may, if the boxes are taken to pieces carefully, be put up for the partitions and fronts of the stalls, and be made to look quite as well as new wood, especially if coated with paint or varnish.

COMPARTMENT FOR KIDS.

Besides the stalls for the goats, it is of the greatest importance that some provision should be made for confining the kids when separated temporarily from their dams. These should be little loose boxes about 2ft. 6in. wide by 4ft. or 5ft. long, and about the same height, or sufficient to prevent the little animals from jumping over. They are best made of narrow boards



about 6in. wide, with a space of a couple of inches between each, so that the kids can see their dams although separated from them.

PLAN OF GOAT-HOUSE.

In order to assist any reader who is desirous of either building a goat-house or adapting some already-erected structure for the purpose, I give a plan (Plate III.) showing the most advantageous and commodious arrangement for a stable, based on the system I have myself adopted. The size of the interior of the building is 19ft. long by 14ft. wide, and it is designed to accommodate 12 goats besides a limited number of kids. *a* shows the stalls 2in. wide, and *a** those of larger size. Each partition is 2in. deep, it being merely necessary to extend them two-thirds of the length of the goats' bodies to prevent their fighting, thus giving them plenty of room to lie down in any position, but preventing their turning round; *b* shows the feeding-boards in front with circular holes for the pails; *c* are the loose boxes for kids, available also for goats that are kidding, the feeding-boards and hay-racks being here placed corner-wise. Between the two sets of loose boxes is the milking-bench, raised two feet from the ground, and with the sliding "guillotine" arrangement for fastening the necks of the goats when being milked. This is described and illustrated in the chapter on milking; but I should here observe that when I first adopted the apparatus many years ago I kept but two goats, and it was then part of the arrangement of the manger to which the animals were fastened. I have since found it better to make a separate compartment for this, and instead of using it with the goats standing on the ground, to fix it on a bench, and to make each goat mount the bench alternately to be milked; this is easily done, and it saves much inconvenience and labour to the operator. The space *c** is for the milker to sit, and on his right hand, and abutting against the adjoining loose box, one or two shelves should be placed to receive the vessels used in the

operation, they being then within easy reach; *e, e, e, e*, are the windows facing the south; *f*, the door, this being like the passage it leads into, $2\frac{1}{2}$ feet wide, sufficient for wheeling a barrow when cleaning out the stable. Enough space is provided between these and the walls for the barrow to pass when the goats are in. The feeding gangway is made 2ft. wide, to enable the attendant to walk between the stalls at the goats' heads when feeding and watering them. I should here remark that under this arrangement it is necessary for the pieces of quartering, or thick rails used for supporting the hay-racks, to be fixed upright instead of obliquely, as shown in cuts at *g*, Figs. 2, 3, in order to allow more room for a person to pass down the feeding gangway; *g*, in the plan, shows the ladder leading to the loft. A loft is always an advantage in a stable, for besides the convenience it affords for storing hay and roots, cutting chaff, &c., the opening or trap-door is valuable as a means of ventilation without a draught. The entrance *f* should be provided with double doors, so that the top half may be left open whilst the bottom one is shut.

In cases where a goat-house of this description is actually erected, as on a goat-farm for instance, another door should be provided either where the step-ladder is now shown at the other end of the passage, or else between the loose box and the milk-ing-bench, *c**. One of these doors should then lead to an enclosed yard with a hard dry bottom, whilst the other opens on to the pasture-ground.

LITTER.

Several kinds of litter are available for goats, but this is required more as a means of absorbing the excrementitious matter than with the object of conduced to the animal's comfort. Indeed goats appear to prefer being without it, for instead of seeking warm beds to lie upon, as dogs, pigs, and many other animals do, they give preference to hard but dry

ground ; and when straw, brakes, and such litter is provided for them they generally scrape it away with their fore feet to the rear. For the purpose of collecting and utilising the manure, however, it is necessary that some kind of bedding should be provided, and the more absorbent it is the better. Cheapness is the great point here, usually speaking, and whatever is most available is generally preferred. When straw is at a low price it answers well enough in winter, but should not be employed in summer. In hot weather the goats seem to have a decided objection to being enveloped in straw bedding, and the rapid evaporation of ammonia from the droppings makes the air of the stable unpleasant. Where a common is close at hand, and dried brake-fern or bracken can be obtained and stored for winter use, it answers admirably ; and being obtainable for merely the trouble of collection, has no drawback on the score of expense. Sawdust, when easily available and cheap, is cleanly, cool, and absorbent ; but it does not make good manure. In summer, dry soil is very good, acting both as an absorbent and deodoriser, and is easily got rid of by digging into the garden on removal from the goat-house. Straw or bracken, on the contrary, requires to be collected in a heap to ferment, becoming a nuisance, or at least being regarded as such, in a closely-habited neighbourhood. The best substance of all, however, is dried peat ; it has the advantage of being absorbent to a considerable degree, at the same time that it acts to a certain extent as a deodoriser. It is easily stored for use, is cleanly, and has the merit of being particularly valuable for garden purposes. It can be procured from Messrs. Taylor & Co., of Newcastle, who import large quantities from Germany ; the price varies according to the distance it is required to be sent, being sold in two-ton lots at about forty-five shillings per ton including cost of carriage. This price does not strike one as particularly cheap at the present price of straw ; but it is in reality much less expensive, as it goes so much further. The

peat is sent in compressed bales, and is easily broken or crumpled up into small pieces, which get further divided under the animals' feet, at last presenting the appearance of a kind of coarse, chaffy dust. This may be turned and re-turned several times before it is thoroughly saturated and fit for manure, and even then may be redried if desired in the sun and used over again ; thus it goes a long way.

CHAPTER VII.

PASTURING.

THERE are two methods of treating a goat ; one is by a system of pasturage combined with stall-feeding, and the other by what is known as "soiling," that is, keeping the animal constantly housed, and supplying it with all its rations in the stable. The one to be adopted by the goat-keeper must of course depend upon circumstances, whether he has pasturage at command or not. By the word pasturage let it not be supposed that I mean a small grass-plot, even if it be the size of a tennis-lawn. It is not that the dimensions in such a case would be insufficient to keep a goat during the summer months, but that after a short time the animal would refuse to crop it, as I shall explain presently. As a matter of fact, and this I have proved to my perfect satisfaction, unless a person has a good run of pasturage, and that of the right sort, a goat will thrive better and live longer under the stall-feeding system. Knowing, as every one does, that this animal in its wild state is very active and restless, constantly roaming about from place to place in search of its food, such an assertion as the one I have just made will probably cause some surprise. I have not, however, come to this opinion without a thorough trial, and taking the experience of others as well as my own into consideration. It is further borne out by what is done in the Mont d'Or, one of the chief goat-keeping departments of France. There a great number of these animals are maintained entirely in stables without so much

as a day's grazing in the whole of their lives, yet they thrive well, give a quantity of milk which is utilised for cheese-making, and live for many years. I have had opportunities of comparing goats kept in the country by persons who have a garden with an acre or so of grass, with other goats in London, where they are nearly always in a stable with merely the run of a mews or a back-yard, and these latter always seem to be less subject to disease, and live the longer of the two. The only drawback, where there is no grass or garden, is the extra cost of feeding. No one, however, need hesitate about keeping a goat if he has a dry shed or stable in which to place it, and a good-sized garden to supply it with green food. This latter is an important adjunct, for a goat should have *some* succulent diet if a large yield is expected, although it does not require to be pastured, and when all has to be bought it comes expensive.

There is a great deal of misconception in regard to pasturage for a goat, as I have already hinted. This, many people have learnt after dear experience, and I may unreservedly place myself amongst the number; it enables me the better to guide those who have yet to learn. It is a common saying and a true one, that a goat will live and thrive where most other herbivorous animals would starve; this refers to the steep escarpments and elevated plateaus of mountain ranges where herbage is short and scanty; but the converse also holds good that on a rich pasture where cows would yield abundance of milk, and sheep fatten, a goat will, in all probability, sicken and die.

A goat loves grazing, but it requires constant change of pasturage, and it soon becomes ill if repeatedly put to feed on the same plot of grass, hence it is that a lawn or an orchard, which is too small to enable such conditions to be carried out, does not suit these creatures. They may do well on it for a time, varying from three months to a couple of years, according to the extent of the pasture and the nature of the soil and grasses, but if tethered time after time on the same ground,

although it may meanwhile have been washed by rains, and refreshed by a new growth of herbage, the goat will eventually become ill. These animals do not care for a rich pasture, and will not feed at all on one that has been freshly manured, or that has had the droppings over it, to any extent, of pigs and poultry ; they like coarse grass if not of rank growth, but the kind they prefer, and which suits them best, is the short sweet pasturage on downs and dry commons. On the latter they have the great advantage of a change from the grass to the sweet and tender shoots, prickly though they be, of the furze or gorse bushes, of which they are extremely fond, and which, moreover, contain a vast amount of nourishment. Indeed, although a goat, as I have said, loves pasture, it prefers still more browsing, but the height of its felicity is reached when it can obtain both at will, for it is the constant change from one kind of grass to another, and from cropping herbage to nipping off leaves and shoots, that these animals delight in. It is this peculiar fancy for biting off tender buds, barking trees, and its innate love of destruction, that renders the goat such an enemy to the gardener and the farmer, and makes it such a disagreeable, not to say expensive, matter to the owner, when one of these mischievous creatures makes its way by accident into his own or his neighbour's garden or fields. The only preventive in such cases is the use of a tethering-chain and pin, as I shall presently describe.

An acre of grass, then, is the least that can with advantage be allowed for two or three goats in order to give them a frequent change of "bite," so that they do not go over the same spot many times in the course of a season. But even then the pasturage should be varied to leaves and other food for a day or more at times. This change should be given on wet days, for goats do no good tethered out in the rain ; they hate wet, if it be even a slight shower; but in a heavy storm of wind and rain they go nearly frantic, running round their tether in a furious

manner, bleating loudly all the time, and generally managing in the end to loosen their tethering-pin sufficiently to be able to get free, when they rapidly seek shelter. A goat does not come to the same harm on wet grass that a sheep will, being less subject to the complaint known as "hove" (caused by an excess of green stuff in a saturated condition) than the latter; at the same time it is not good for them, nor even is the grass that has been pushed into rapid and sappy growth by a series of soaking days in a warm atmosphere. It is far better to mow down any over-luxuriant verdure of this kind, on a change to fine weather, and feed this in small quantities, with hay and corn, to the animals when in the stable. Where a goat and a cow are put on the same pasture economy is effected, for the cow with its tongue soon takes off the overgrowth, leaving the goat, which can bite much closer, to follow it after the rankest has been taken.

One great point to avoid in pasturing a goat is to put it suddenly on to this kind of food after being accustomed to hay and corn in its stall, more especially in the spring of the year, when the fresh grass is sure to scour it, and often so seriously as to cause death. The change should be made as gradually as possible, starting with, say, a quarter of an hour or so in the morning and afternoon at first, and extending it by half an hour or so a day until the animal is thoroughly accustomed to the new diet. Pasturing should not be attempted before the middle of March, and should cease altogether in the middle of October. An occasional run over the field for about an hour now and then on fine days, and when the ground is tolerably dry, is all that should be permitted during winter, and then only after a meal of hay or corn.

Soil :—Another important consideration in regard to pasturage is the soil. Goats will never do well on a stiff clay or on any marshy kind of ground, and it is far better not to put them on grass at all, except during the driest days of summer, if the soil

is of this description. Gravel will do very well, but the best is chalk. Besides the comparative dryness of the latter, the herbage that thrives upon it, and which at the same time never grows to rank luxuriance, is the kind of which the goat is most fond. Amongst this may be mentioned the *Festuca ovina*, or Sheep's Fescue, a short, fine grass, which grows in a tuft at its roots, and pushes up delicate stems rarely exceeding 12in. in height. This grass abounds largely on the highlands of Scotland, the mountainous parts of Wales, and on many of the downs in England. Two other kinds of the same genus, viz. the Hard Fescue (*Festuca duriuscula*), and the Red Fescue (*Festuca rubra*), are also favourite grasses of goats. When a goat is able to roam about and choose its pasture, it can correct any redundancy of one kind of herbage which alone might have a prejudicial effect by a change to another sort having an opposite tendency. This she is unable to do when tethered on the same soil, and with no variety of pasture.

Tethering :—This is performed by means of a rope or chain, one end of which is fastened to a “tethering-pin,” and the other slipped into a spring-hook attached to the collar of the goat. I must here remark that these animals, being very powerful, whatever is used to secure them, either in the stable or out of doors, should be of the strongest kind. A rope is not good for this purpose, for although it may be strong enough for a time, it “kinks” after being dragged through wet grass, shortening the length of the tether thereby, and also getting entwined round the body or legs of the animal. It is much better in all cases to use a light iron chain with a couple of swivels, one near the spring-hook, and the other at the end where it joins the collar. This prevents the chain from getting twisted into knots. It may be procured at all large ironmongers of any desired length, at a cost of sixpence per yard. A dog-chain is hardly long enough for this purpose, as the length of the tether should be quite three yards. A tethering-pin (Fig. 6a)

is a square rod of iron, 15in. long, tapering to a point, the head of which is furnished with an *s*-hook which will turn in any direction without entangling the chain. This can be made by any blacksmith, and costs two shillings. When two or three tethering-pins are required, they may be made at much less expense by procuring a similar rod to that described for

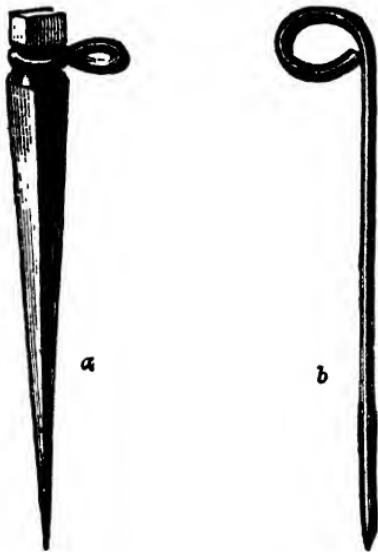


FIG. 6. TETHERING-PINS.

fastening the goat in the stable. One $4\frac{1}{2}$ ft. long, which may be bought for about 1s. 6d., will make three pins. The rod is easily broken into three by first filing all round the part where the fracture is required; then take each piece, and after heating to redness, bend one end in the form of a loop, as shown at Fig. 6b, and hammer the other extremity to a point to facilitate its progress into the earth.

The length of the pin from the loop to the point should be 12in. or 14in. This kind of tethering-pin has two advantages over the previous one. In the first place, if the loop be made the exact shape of that shown in the cut, no swivel will be needed, as the pin turns round in the hole it has formed in the ground to whatever direction the goat moves, and, in the second, it is easily forced into the earth by the pressure of the arm, whereas the square rod requires to be driven in with a mallet, which is not always at hand. The square pin is, of course, the stronger, but it has this objection that if struck hard with an iron hammer the head is very apt to break off. Care should be taken in making it that the "S"

hook works freely round the neck. Which ever pin is employed, it is a good plan to insert a spring-hook in the loop, so that any link of the chain may be caught when it is desired to shorten the range, such being often the case when a goat is tethered in a garden to eat off the haulms of peas and potatoes or the stumps of cabbages before having them dug up. On such occasions a very limited range is frequently necessary in order that the animal may consume what is intended for it without injuring neighbouring vegetables or trees ; the ease and efficiency with which, by the use of the spring-hook, this is performed will readily recommend its adoption.

Some people, instead of tethering a goat, let it roam about at will, having previously fastened a "puzzle" round the animal's neck, which prevents its making its way through fences and palings. The puzzle, a sketch of which is given (Fig. 7), is made in the following manner. Procure three pieces of strong wood, or what is better, if obtainable, three sticks of bamboo, which combines strength and excessive lightness; these should be from 2ft. to 2ft. 6in. long according to the size of the goat, and must be fastened together in the form of a triangle, leaving the ends projecting. The horizontal piece at the bottom, which is somewhat thicker and

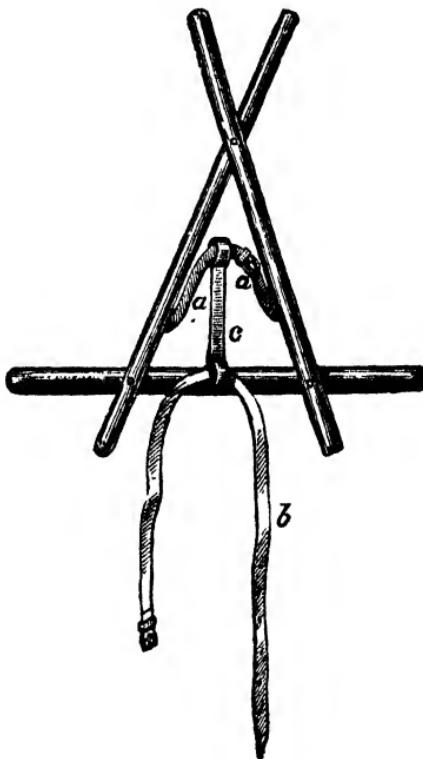


FIG. 7. THE PUZZLE.

The Book of the Goat.

heavier than the other two, should be secured to the latter by means of iron pins or rivets instead of being nailed, as this allows the sticks to work freely one against the other. The cross-pieces at the top should be joined by a "thumb" or "fly" nut, in order to be easily parted when the apparatus is put on the animal. When applied to goats having no horns, the fly-nut is unnecessary, as, if the pieces are fixed, the whole thing can be put over the creature's head. To the inside of the sticks a couple of straps must be attached which buckle over the goat's neck, their object being to support the weight of the puzzle and ensure a better fit. To prevent it from slipping on to the horns when grazing, another strap is necessary, which buckles round the body, and is joined to the former by a shorter piece of leather having a loop at each end through which both pass. Nothing answers better for this than the leather handle of an ordinary double rug strap. The arrangement will be better understood by a glance at the woodcut in which *a* represent the two straps which go over the neck, *b* that which fits round the body, and *c* the short piece joining the two together.

Besides this apparatus, some people, to prevent a goat from leaping over barriers, fasten a cord to a hind leg and a fore leg, allowing only sufficient length for it to walk, and that with some difficulty, but not enough to enable it to jump. Another plan is to put a headstall on the goat, and to fasten a strap round the body to come just behind the shoulders, attaching the two together by another strap which joins the headstall under the throat and the body strap between the fore legs, a hook and ring being employed here to fasten or unfasten the connection at pleasure. The length of the strap or surcingle must be just sufficient for the goat to hold its head on a level with the body or slightly higher, but not enough for it to bark trees or get at fences. Although effectual for the purposes to which they are applied, I do not recommend, except under

special circumstances, the adoption of either of these expedients. In the first place, the animal's comfort is to a great extent sacrificed by the contrivances employed, and in the second, if we except the trouble of having to shift the position of the goat, no advantage is gained over the tethering plan, it being a fact that goats, as indeed all milch stock, thrive better and give more milk when tethered than when allowed to go free, it being of course understood that they are changed to fresh herbage as soon as that within reach gets soiled or consumed.*

Although grass forms the principal food of a goat, it is very beneficial to supply it, when possible, with leaves and brambles, besides a certain amount of extra feeding with corn and hay, the quantity depending on the time of year and the milking condition of the animal. In spring and early summer grass is in its prime, and, if the pasture be good, will support a goat entirely, unless it has lately kidded, when it will require the assistance of a little corn to put on flesh and get it into condition to bear the drain that is being made upon its system by the supply of milk.

* Under the title *A Protection against Goats, &c.*, the following interesting note appeared in *Notes and Queries*, Oct. 9th, 1880, signed GEO. A. MULLER, St. Martin Lautosque, Alpes Maritimes. Nearly everywhere in the Maritime Alps, in a good many parts of Switzerland, in Southern Germany and Tyrol, people who want to protect their land from the inroad of goats, sheep, and cattle in general put up a stick surmounted by a small bundle of straw, or simply tie a small bundle of straw to a branch, and thereby find their ground as safely guarded as if they had placed a policeman there. Is this custom to be found anywhere in England? I fancy I have noticed it in North Wales. What is its origin?

CHAPTER VIII.

STALL FEEDING.

IN feeding any kind of milch stock, there is this point to be considered, viz. what description of food will produce the largest return in milk? From some carefully-conducted experiments recently made in Germany to ascertain the influence of different foods on the quality and quantity of milk, the conclusions arrived at were that the quality of milk, in so far as the relative proportions of its constituents are concerned, is in no way altered by any particular diet, but depends on the breed and peculiarities of individual animals; the quantity, however, may be affected by the nature and character of the nourishment taken. Without going into scientific details, I may just mention that every species of food, as all are aware who have any knowledge of chemistry, contains two important elements, the nitrogenous or flesh-forming, and the non-nitrogenous or heat and fat-giving principles, otherwise called carbohydrates. Now it is to ascertain which of these two elements has the greater influence in the production of milk that most of the experiments have been directed. In the case just referred to, the largest return of milk was furnished by a diet rich in nitrogen, the food supplied being at one time highly nitrogenous, and afterwards containing but a small proportion of the flesh-forming element.

Other investigations tend to show, however, that the nature of the food consumed does not exert so very sensible an influence

on either the quantity or chemical composition of milk if an equal amount of nourishment be obtained from the different kinds of food. During the last half century chemistry has made such rapid strides, especially with regard to analysis, that at the present day there is scarcely an article of diet in its simple form the chemical composition of which has not been ascertained. The following are the cattle foods which contain the largest amount of nitrogen :—First and foremost stand the various cakes made from linseed, rape, and cotton-seed ; then in their order follow lentils, beans, peas, clover-hay, bran and oats, and among the fodder plants, grass (Timothy and Meadow foxtail), tares, lucerne, red clover, and white clover.

I mention these particulars in order that those who desire to experimentalise upon their goats, with a view to ascertain the relative influence of the different foods upon the produce of the milk, may be enabled to do so. For my own part I am quite certain that however much the chemical constituents of the diet may affect the supply of milk, the quantity of food assimilated by the animal influences it much more. It is generally admitted by dairymen that grass and roots, in fact, green food generally, makes more milk than dry food. This I have also found to be the case in feeding goats, and I attribute the increased yield to the succulent nature of the diet ; though, at the same time, I think the milk is thinner and more watery. An interesting article on this subject, entitled ‘Green Food or Dry Food?’ appeared in the *Milk Journal* of Sept. 2nd, 1872, giving the results of a series of experiments which bear out what I have stated. From these it appears that “dry food operates in the direction of an augmented consistency of the milk, and an increase in the live weight of cattle fed upon it, whilst green food, on the other hand, chiefly influences the quantity yielded.” The food used in the experiments were green clover in the one case against clover hay in the other, combined in both instances with oat straw.

After all, the great secret in obtaining a large yield consists in a constant change of diet. I believe there exists no animal, if we except the pig, that eats so great a variety of food as the goat. Yet, on the other hand, there is none which sooner tires of one thing, or is more fastidious in regard to the cleanliness and quality of each article.

GREEN FOOD.

With regard to the variety of plants a goat eats, some experiments were once made in Sweden and in France which bear on this point, and I therefore give them for what they may be worth.

EXPERIMENTS IN SWEDEN.

Of 575 Plants the Goat eats 449, Refuses 126
,, 528 ,, Sheep ,, 387, ,, 141
,, 494 ,, Bull ,, 276, ,, 218
,, 474 ,, Horse ,, 262, ,, 212
,, 243 ,, Pig ,, 72, ,, 171

EXPERIMENTS IN FRANCE.

	Goat.	Sheep.	Bull.	Horse.	Pig.
Can eat ...	547	408	311	268	86
Is very fond of ...	28	81	121	113	36
Sometimes eats ...	32	33	70	39	23
Takes in all ...	607	522	502	420	145
Refuses ...	83	133	183	235	169
Total plants examined	690	655	685	655	314

The results are, apparently, not alike in both cases, owing probably, to different herbs abounding in the two countries. As in France the experiments appear to have been carried out in the greater detail, we may take the latter to be the more correct; there we see the goat consumes no less than eighty-five more plants than either of the other herbivorous animals.

I should be careful to observe, however, that there is a vast

difference between what goats as a race will eat, and what an individual specimen is ready to consume. Any person keeping half-a-dozen of these animals together will find each has its likes and dislikes in regard to its food, quite as much as any member of his family, one eating with avidity what another will reject. In fact, that essentially "goaty" word "capricious" applies as much to its appetite as to its other characteristic points, and, therefore, it is impossible to lay down any hard and fast rule as to what a goat may be fed on, and expect it to apply to all goats alike. There are some things which I may mention as generally supplied in the way of green food, and which are in most cases appreciated, even though a small portion only may be consumed at one time.

Roots :—These in their order of preference are: mangolds, potatoes, carrots, swedes, Jerusalem artichokes, parsnips, and turnips, the last-named being liked perhaps least. They must be all scrupulously clean ; though in regard to mangolds and swedes it is less important if they are cut in half, and each semi-spherical portion placed, the cut part upwards, at the bottom of the goat's pail. It can then scrape or bite off portions with its teeth without the root being displaced by the force and action of the jaws. The operation will be continued all round the inside until only the rind is left, like an empty shell. I have tried giving roots pulped in a machine, and also the same cut into squares, but the other plan answers best by far, being less wasteful, and at the same time it appears to give more enjoyment to the animals. Mangolds are best given after Christmas, for when first pulled they are very apt to scour. It is best in all cases to begin this kind of food gradually. Small potatoes called "chats" may be supplied whole, but these, as well as larger ones, are preferred chopped. They require to be carefully washed of all adhering grit first, otherwise they will be refused. Carrots and parsnips are nice wholesome roots, and containing as they do a large quantity of saccharine matter, are

fattening ; the peelings of these and potatoes are generally eaten as readily as the roots themselves.

General Garden Produce :—Amongst other garden produce may be mentioned the haulm of peas and beans, lettuces run to seed, cabbage-stumps, the early fallings of pears and apples when too small to be utilised in cookery, the thinnings of raspberry-canées, ivy cuttings, the prunings of all fruit-trees, the leaves even of dry autumnal fallings, and the trimmings of hedges and vines ; lastly, acorns and horse-chestnuts. No goat ever refuses the produce of trees, be it fruit or branches : they have an especial preference for the bark and peel, and even eat the wood itself when of the first year's growth. Cabbages and lettuces will be consumed almost to the base of the stalks if they are hung up at an elevation so that the animal may constantly nibble without soiling any portion with its feet, otherwise only a small proportion will be eaten. This applies generally to all the food of a goat, for the moment it is trodden underfoot the goat ceases to eat it. It is, therefore, a great advantage to place branches or fibrous-rooted vegetables in the position I have described, for otherwise a large quantity will be wasted.

Acorns and horse-chestnuts are in some years very plentiful, and as they can then generally be bought at about 1s. per bushel in country places, it is advisable under such circumstances to lay in a stock. Besides being a cheap kind of food, both are most useful in a medicinal way, as they have a constipating tendency, and are valuable to give as a change when the bowels are relaxed through the animal having partaken of food having an opposite effect. Acorns and horse-chestnuts are not so constipating in their results when they have sprouted. In this condition saccharine matter being developed they are very fattening and highly relished. All that is necessary to produce this germination is to pile them in a heap a few at a time in a warm damp place. They should be washed clean first, for if this be done afterwards the tender shoots which

the goat so much enjoys are knocked off in the process and lost.

Weeds :—There are many weeds that goats will eat readily, and which are generally consigned to the rubbish heap. As instances of some of the most common I may mention, sow-thistles, docks, plantain, early spring nettles, and dandelions. They are also very fond of meadow-sweet, though cattle will not touch it. All leguminous plants, as vetches or tares, lucerne, saintfoin, trefoil clover, and such like, are eaten by goats; but not voraciously, this being a more succulent herbage, which though good for the production of milk, does not appear to be appreciated by these animals, who give preference to hard, bitter, and woody kinds of plants.

Trees and Plants to be Avoided :—There are many plants and shrubs that are poisonous to one kind of animal and devoured with impunity by others, goats being generally amongst the latter. Thus the long-leaved water-hemlock will kill a cow, whereas the goat browses on it greedily. There are a few things, however, which should be avoided, as they are generally poisonous. I say generally, because, strange to relate, even the same shrub does not seem to have at all times an equally prejudicial effect; thus yew will cause death to sheep, goats, and other ruminants at one part of the season, but at another may have scarcely any ill consequences whatever. This is one of the trees, however, which it is best at all times to avoid giving; another is privet; the leaves have not, I believe, any ill consequences, but the berries will, if accidentally partaken of by a goat, prove fatal. Rhododendrons have been mentioned to me as very poisonous to the caprine species. Mr. Thomas lost several of his best stock once through feeding off this shrub, though I had never heard before of its being poisonous. Monkshood will quickly kill a goat if it should happen to partake of it, though, strange to say, horses can eat it with impunity.

DRY FOOD.

Hay :—Hay is best supplied in its entire state ; but may be cut up into chaff and mixed with the provender. As, however, this requires the use of a chaff-cutter, which it is not worth while to purchase merely for goats, it will be generally given as hay, and not as chaff. Bulky food like this serves the purpose of filling the stomach, which requires a certain amount of distention to enable it to perform its functions properly. To effect this with corn alone would, in the first place, be expensive ; and secondly, so large a quantity of concentrated food would be injurious. In fact, hay or chaff given in conjunction with corn may be regarded in the same light in the diet of a goat as bread and vegetables combined with meat in that of man. There are two kinds of hay—meadow hay, composed mainly of grass with a few herbage plants, and clover hay, made with that plant alone. The latter is generally preferred by goats, but the former is considered best for milch stock, besides also being cheaper.

Hay is an article which varies greatly in quality, and some care and judgment should, therefore, be exercised when buying it. Reject in particular any that is musty, which may easily be recognised by the smell, as in that state it has lost a considerable amount of its nutritive properties. Colonel Fitzwygram, in his book on 'Horses and Stables,' summarises his remarks on the characteristics of good hay as follows :—“ Cleanliness, firmness, crispness, freshness, green colour, delicacy both in taste and aroma, and appearance, the presence of flowers in their natural colours, numerous varieties of grasses, and a proportion of good herbage, are the most marked characteristics of the best hay.”

Oats :—Oats may be regarded as the staple corn for goats that are dry, being more frequently given than any other. It is, moreover, the cheapest of all grain, and the richest in

albuminous compounds or flesh-formers. The best oats I always consider the most economical in the end, as inferior kinds contain so much husk in proportion to kernel that but little nourishment is obtained from them ; the husk of this cereal, like most others, having little or no nutritive value. In describing the characteristics of good specimens of this grain, I cannot do better than quote the remarks of the author already alluded to. He says :—"Good oats are clean, hard, heavy, dry, sweet, plump, full of flour, and rattle like shot ; they have a clean and almost metallic lustre. Each oat in a well-grown sample is nearly of the same size. There are but few small or imperfect grains. The hard pressure of the nail on an oat should leave little or no mark. The kernel when pressed between the teeth, should chip rather than tear. The skin should be thin ; the size of the kernel will be less in proportion as the skin is thick. The colour of the oat is not very material, but white oats are generally thinner in the skin than black. Again, black oats will grow on inferior soils. Short plump oats are preferable to large long grains. Bearded oats must have an excess of husk. Oats are not necessarily bad because they are thick-skinned, or bearded ; but they must contain a less amount of flour per bushel than thin-skinned oats without beards. Good oats are entirely without smell of any kind, except that of earth, in new samples. The flour should be almost tasteless, except a slight sense of milky sweetness to the palate." In purchasing oats I always choose the Scotch variety ; the grains are short and plump, more resembling barley in appearance, and containing a large percentage of flour. The best weigh from 40lb. to 42lb. the bushel, whereas inferior kinds weigh only 30lb. or 32lb.

Indian Corn :—This grain contains a considerable amount of nutritive properties, the greater proportion of which go to the formation of fat, and for goats in milk I prefer it to oats. Mixed with peas or beans it forms capital food, and may

advantageously be supplied as a change. Indian corn varies considerably in price, but when cheap it costs weight for weight less than oats as it is much heavier. There are two kinds, the large and the small, the latter being the most suitable though fetching rather more money. The large kind should always be given crushed.

Beans and Peas :—Both beans and peas, as I have already stated, contain a large amount of nitrogen, and therefore make valuable food. Given in the form of meal, beans have the character of inducing milk rich in quality, but I do not find that goats take readily to it ; besides, it comes rather expensive. Beans should be split ; they are most nutritious when about a year old.

MISCELLANEOUS FOOD.

Under this title may be mentioned brewers' and distillers' grains, and all sloppy food, also oil-cake, bran, meal, &c. These have a very decided effect upon the supply of milk, the former influencing the quantity, and the latter the quality. Out of half a dozen goats there may be quite half which will not touch grains, especially at first ; they prefer, I have generally found, the brewers' to the distillers', though they may be brought to like both by tempting them with small quantities at a time, and especially when placed with goats that do like them. Some goats have a great partiality for sloppy stuff, like bran mashes, coarse oatmeal upon which boiling water has been poured, or barley-meal mixed with water or skim-milk. In the Mont d'Or, where, as I have already stated, goats are largely kept on the soiling system, this taste is encouraged, greatly to the advantage of the goat-owner. Here they even go so far as to mix the meal with pot-liquor. There is no doubt, as I have frequently proved, that where a goat has a liking for a moist diet she gives an increased quantity of milk.

Oil-cake and condiments add to the richness of the yield,

but they should be sparingly supplied. Amongst the former, cotton-cake—which is the cheaper—is not liked by goats, and even linseed-cake is often only appreciated at first, though they soon get to relish it. The kind of cake I prefer for goats, and which I have found them eat with the greatest avidity, is what are known as the Waterloo Round oil-cakes, supplied by the Waterloo Mills Co., Hull.

CONDIMENTS.

The artificial foods known by the name of "condiments" are composed of a mixture of the most fattening and nutritious grains, combined with aromatic herbs and spices, the whole finely ground, and forming a highly stimulating compound. I have personally tried that known as "Thorley's Food," and have certainly found it efficacious to some extent by increasing the supply of milk. It may be as well to state, however, that, like all stimulants, it ceases to have effect if continued for an indefinite period, and should therefore only be given for a certain length of time.

WATER.

Besides dry food and forage, there are two other articles of equal importance which must never be omitted; these are water and salt. The quantity of water a goat drinks depends upon the amount of milk she is supplying, and the nature of the food she consumes. One that gives two quarts a day and exists chiefly upon hay and corn, may take in summer from two to three quarts in twenty-four hours; whereas the same animal in a dry state, and living on green and succulent vegetables or grass, will not drink as much in a week. Goats should never be allowed to suffer from thirst, but should have a pail of clean water offered them morning and night, and, if rejected, it should be left by their side for a quarter of an hour or so; as although they may

refuse to drink before having had their feed of corn, they will often do so when the latter has been consumed. It is a bad plan to leave water standing in the goat-house all day, as it is liable to become tainted by absorbing the ammonia and other gases from the litter, in which state it will probably be refused. Water, too, that is soiled or greasy, or in which chaff or hay has fallen, will be just sniffed and turned from in apparent disgust; indeed I have even known them go so far as to endeavour to overturn the receptacle that contains it. The drinking propensity of a goat should always be encouraged, as a great drinker is generally a good milker. Where clean soft water is procurable, it should be given in preference to hard.

SALT.

Next to food and water, salt is most important for maintaining health and condition. It assists digestion, and furnishes certain necessary elements to the blood, acting also as a preventative against worms. Moreover, it incites thirst, thereby causing a greater amount of water to be drunk, which increases the quantity of milk. Goats, like most herbivorous animals, are particularly fond of salt, and will lick it with great relish for a length of time; those in a wild state travelling long distances from their usual haunts in order to obtain it. This article should not be given occasionally, but constantly; a lump of rock-salt being left at all times where access may be had to it whenever desired. The larger the lump the better, as small pieces often get lost, or are eaten whole, in which case more is taken into the system than is actually beneficial. At certain periods of the year salt is more requisite than at others; in spring, for instance, when grass is deficient in saline material, a small quantity of table salt may with advantage be mixed with the provender, unless Thorley's food be given, when it is unnecessary, that condiment having already a considerable amount of the material in its ingredients.

RATIONS.*

The quantity of food to be given must depend on the capacity of the particular animal, some being larger eaters than others. Goats that are in full milk require to be fed more than those that are going dry. According to a French writer, M. Magne, the goats in the department of Mont d'Or receive during summer four meals a day. The first is given at about six o'clock in the morning, the second at eleven, the third at four, and the last meal at eight in the evening ; the goats receiving, to begin with, an armful of cut grass, clover, or tares ; then chopped roots or peelings of vegetables mixed with bran or ground-up oil-cake, and soaked with water ; the last meal being dry food of some sort. In winter there are only three distributions, the quantity of water mixed with the food being increased.

For my own part, I cannot say that I find goats generally relish these mixtures made moist with water, probably because they are not brought up to eat this kind of food. It would be better if they were. My own arrangement for the distribution of the meals is somewhat as follows, allowing for certain changes according to what is most plentiful in the way of green food :— In summer, the first feed, which is given between six and seven o'clock, consists of a good armful of cut grass ; those that are in profit receiving also whilst being milked two large handfuls of maize with one of bran ; water is also supplied at this time. About eleven o'clock, leaves or vegetables from the garden. At three in the afternoon, grains or bran, toppings, or meal of some sort mixed stiff with water. Lastly, at eight in the evening, either cut grass or hay, with corn to those requiring it the same as in the morning ; water being again offered. In winter the first meal is given at eight a.m., and consists of hay, the second at midday, when either vegetables or roots are

* See "Cost of Food *versus* Value of Milk," in the chapter on Goat Farming.

supplied ; grains, acorns, or cake are given at four, and corn and hay and water to *all* at eight by lamp-light. I always make a point of having the goats fed in the evening not earlier than eight o'clock, and on substantial food, as they have to go so long before the next meal in the morning. This arrangement, it must be understood, applies only when goats are housed all day. When pastured, the corn is given still to those goats that are heavy milkers, especially if they are low in condition ; but the others are turned out at once to feed on grass. The rations of hay and corn at night, however, are not altered.

In feeding with corn I should remark that it is well to mix some bran, chopped hay or clover with it when the animal is a voracious feeder, but otherwise it is not necessary, as some goats will object to this addition, and then the corn is best supplied alone. When mangolds or potatoes and other peelings are given chopped up, they will sometimes be more acceptable to the animals by being dusted over with bran, pollard, or middlings ; they are of course more nourishing under these conditions, and the addition is useful to restore a goat that has lost flesh. Bean-meal and peas in these cases have a very decided effect in increasing the yield of milk, and may be given by way of a change ; but this food is too expensive for general use.

In giving out the rations to the goats there are three important rules to remember :—First, that whatever the food may be, it is presented in a perfectly clean condition ; that the pails or feeding-boxes are equally clean, and if there should be the remains of a previous meal left in them, that it be thoroughly emptied before placing in anything fresh.

Second, that no more be ever given than can be consumed readily at one time. There is no creature that can be more wasteful in its food than a goat if improperly fed. Those that object to hay-chaff being mixed with the corn will turn out half the contents of the pail in their endeavour to pick out the latter. The moment a goat is seen to leave off eating readily, and to

begin "nosing" its food in order to select tit-bits, take it all away. Hay should always be supplied sparingly, otherwise half of it will become litter instead of food.

The third rule consists in feeding at regular hours. This is an important point, and should be carefully observed. The appetite of an animal is more even, and it enjoys its food better when supplied at stated and regular intervals, than when given at different and constantly varying periods.

STORING FOOD FOR WINTER USE.

Goats are very fond of all kinds of dried fodder, and there are numerous articles which in summer are plentiful enough, and may be utilised in winter if collected and dried during hot weather and then stored. Indeed, many goats prefer the dried food to the same articles in a fresh condition. This plan is largely in use on the Continent, and the mode adopted is well described by Miss Arnold in one of her writings as follows:—

"Keep your garden trimmings, your tree, and bush, and hedge-loppings from the rubbish-heap while the leaves are yet unturned, and lay them on sheets or flags in the mid-day hours to dry thoroughly on the stalks and boughs, during which time they must be well watched, and no intervals of damping allowed. Throw them under a roof at night, and out again when the dew is off; then store them up lightly on poles laid across the roof-beams of a barn or other outbuilding, or suspend them in bunches, like pea-stick faggots, from the beams themselves. In this way vine-clippings, the prunings of fruit-bushes, thorn-hedges, rose-trees, and even herbaceous plants, as chrysanthemums, &c., may become a winter store, and by the succulency they retain permit the introduction of more straw into the chaff of a dear winter." In regard to this kind of food I may remark that when goats are allowed to wander about in a yard as a means of exercise, it is a very good plan to obtain all the loppings of trees you can get, and to throw them down for the animals to

peel off the bark. There is scarcely any food that a goat takes to like this, and I cannot doubt that it is highly beneficial for it.

GROOMING.

It is a good plan where goats are kept constantly in the stable with little or no exercise, to brush them down every morning with a stiff dandy brush, and, if the hair be very long, to now and then comb it out. Some persons may call this absurd, but when they consider that grooming is to an animal what a bath is to a human being, they must admit that the practice cannot be otherwise than beneficial. The advantages gained are indeed more than primarily might be supposed. In the first place, every domestic animal is liable to the attacks of vermin, whether fleas or lice, goats being by no means exempt; but, on the contrary, and especially when in a poor condition, they are often very much troubled with the latter pest. By the use of a hard brush, well applied every day, the dirt which collects on the surface of the skin, and which seems to breed such vermin, is removed, and having no longer a resting-place they disappear—at least, to a great extent—the object of grooming being more as a preventative than a cure. When existing in large numbers other means must be used to exterminate them. In the second place, the friction on the skin of the goat by the brush causes a quickened circulation of the blood, thus to some degree taking the place of exercise and so promoting health. Finally, the use of the brush gives the coat a fine sleek and glossy appearance, and by reason of its extra cleanliness allows of the animal being stroked and caressed—marks of kindness to which it is very sensible—without soiling one's hands.

PARING THE HOOFs.

When goats are kept constantly in stables, it is necessary to examine and pare the hoofs every now and then, otherwise they are apt to grow to abnormal proportions. I have seen these

animals, when this matter has been neglected for a long period, go about with the horny part of the hoof three or four inches long and turning up at the ends like a Dutch shoe, causing a peculiar rattling noise as it walked. When goats have a daily run on hard ground, the hoof is of course worn down by the friction induced, but if the animal is always standing on straw or other litter there is nothing to prevent the corneous substance from attaining excessive growth. With some goats this growth seems to be more rapid than with others, though kept under the same conditions, and they sometimes require their hoofs to be pared even if they are partly on grass. There is no difficulty whatever in the operation, which simply consists in cutting away the horn that overlaps the frog or the sole of the foot until the two parts are on a level. If dirt has got in between and is not dislodged by the paring, it should be scraped out, as it is liable to cause foot-rot.

CHAPTER IX.

* BREEDING.

GOATS in a wild or half-domesticated state breed but once a year. They pair between October and December, and bring forth their young about March or May, the period of gestation being twenty-one weeks. Domestication, however, shows its effect in this as in many other instances, and a goat that is well-housed and fed on corn will often breed twice in the year and at almost any season. The best months for pairing are September, October, and November; as then the kids will make their appearance from February to April; thus by the time they are weaned the new grass has commenced springing up, and affords a tender bite for their young teeth. The earlier in the year they come into the world with this condition the better, as they have then all the spring and summer, when feed is best and most abundant, for their growth and development. Although the best season for breeding is in the early part of spring, where several milch goats are kept it is not advantageous to have them all in full profit at this time, as then the supply of milk is greater very often than there is need for; whilst in winter the animals would be nearly dry, and then milk would be scarce. They should therefore be arranged to kid alternately; for instance, when three is the stock in hand, one should breed in April, another in August, and the third in December, or two in the summer when milk and cream are most required, and one in the winter.*

* See tabular arrangement for periodical breeding on page 206.



LEADON DASHA - IMPORTED NUBIAN MALE GOAT.

The number of kids a goat brings forth at a birth varies from one to four. It usually happens that on the first occasion a single kid only is produced, but afterwards there are generally two, and sometimes three. Four at a birth although exceptional is not very uncommon, and when it once happens is frequently repeated; indeed I have noticed as a singular fact, that whatever be the number produced on the second occasion, the same will often be continued in subsequent litters, and not only this, but that the peculiarity descends from mother to daughter. A goat of my own which has always three every time she kids, inherits this property from her parent, which did the same before her. So large a litter, however, is by no means desirable, as the kids are generally smaller in consequence, and cannot be properly reared by one goat, unless she be an extraordinary milker, three, indeed, being more than some can manage to suckle. A goat makes the best return in milk with its second or third lot of kids, continuing in its prime until six years old. After that age the supply declines at each kidding, and it is seldom of much use for milking after nine years old, though I have known exceptions. The natural term of life is about twelve years, but I have heard of one living to eighteen, and giving a pint of milk a day even at that age.

AGE FOR BREEDING.

In no domestic animal is the instinct of reproduction early developed as in the goat, its precocity being indeed almost incredible; thus I have known instances of kids being mated at less than four months old whilst still sucking their dams, and producing a live kid in due course. If a young goat is kept with a "billy" it is almost sure to come in season in September or October, whether born the previous January or as late as May or June, so that it is much better to keep them quite away from the male until they are old enough to be allowed to breed. Until the last seven or eight years it was a

very common practice to let a goat have young when barely twelve months old, the consequence was that a large proportion were of diminutive size, having been stunted in their growth thereby. Nothing is gained by such a practice, for the quantity of milk obtained in such cases is very small, as a rule, and the kids that are born are undersized. The earliest age that a goatling * should have access to the male is fifteen months, but for exhibition purposes it is better to wait a few months longer, to give time for a more complete development of the frame to be attained before the system has to undergo the drain upon it incidental to pregnancy and subsequent lactation. Although this may be at first more expensive, as the goat has to be kept longer before making any return, it is the most profitable in the long run, the value of the animal being greatly enhanced, and the yield, I believe, increased.

A goat may come in season at any time after parturition, and until conception has actually taken place will continue doing so at intervals according to the time of year. From September to December, or as far on as January, this is generally repeated about every three weeks; from thence till the end of March the intervals are longer, and from that month up to the close of August a goat may go the whole time without showing any signs of a disposition to breed. It almost entirely depends upon the system of feeding; where the animal is housed and fed much on corn she may come on several times during the summer months. The presence of a he-goat is also very apt to encourage this condition. The duration of the period is also regulated by the time of year. In the autumn it will last three days, but in spring only two, and after that perhaps only for twenty-four hours.

Signs of Season :—The period of the sexes may be recognised by an extraordinary restlessness on the part of the animal, a peculiar and continual bleating accompanied by rapid shaking

* A young goat over one year and under two years old.

of the tail. Her yield suddenly diminishes, and she loses her appetite, whilst there is also a considerable swelling of the vulva. If a male goat should be in the neighbourhood, and the female is loose and able to escape, she will in many cases make straight for him though a mile or two may divide them.

PAIRING.

When a goat is observed to be in season the services of a he-goat should be obtained without loss of time, and on his arrival the pair should be placed together in a stable by themselves. When they first meet it generally happens that they commence fighting, though in their idea probably it is regarded merely as play ; the tremendous blows, however, they inflict upon each other with their horns would lead any one not accustomed to these animals to suppose they were engaged in serious combat, suggesting their separation at once. This need not, however, be done, as after a time they come to a better understanding. It is not often that owners of stud-goats will allow their animals to be sent away from home, requiring, on the contrary, that the she-goat be brought to them. In such case, if the goat has far to travel, it is better not to place her with the male until a certain time has been allowed for her to rest and recover herself from the fatigue of the journey, the same remark applying equally to the he-goat when sent to the female. It is not necessary that the pair be left together for any length of time, provided the she-goat is quite in season, as impregnation generally takes place with the first contact, though it is advisable to allow a repetition in order to make quite sure. I may here observe that when pairing takes place during the regular rutting season, or from September to January or even February, it is nearly always successful, providing that the male animal is sufficiently vigorous ; but after that month conception becomes uncertain.

CHOICE OF THE STUD GOAT.*

In a previous chapter I explained the points to be sought for in a good she-goat. I have now to make the reader acquainted with the necessary qualities of the male. Size is here of greater importance than in the female, therefore a fine well-developed animal should if possible be obtained. In my earlier work I stated that the age of the stud goat must not be less than two years, but further experience has led me to the conclusion that at eighteen months, or even fifteen, a he-goat, if well grown, is fit for service. I have, indeed, seen good stock got by one that had not reached twelve months, but I do not recommend this in practice.

A he-goat should have a small neat head with plenty of beard, and neck short and thick, with abundance of hair. The horns may be large, but not too coarse and heavy. The chest should be broad and massive, the back long and straight, and the ribs well rounded, the tail being placed high up on the hind-quarters. These are required to be as square as possible, the reverse being the most common failing of he-goats. The legs must be straight, thick, and strong, and well covered with hair on the thighs and buttocks. No better specimen of the type of animal I am describing could be found than that shown in the engraving (Plate I.), which represents a remarkably fine English stud goat, winner of many prizes, until recently the property of Mr. E. T. Crookenden, so well known as a successful exhibitor at all the metropolitan goat-shows. This goat possesses each of the qualities I have mentioned, besides what is of no mean importance, a noble and thoroughly masculine bearing.

* A 'Stud Register' is published annually by the British Goat Society, giving the names and owners of pedigree stud goats selected by the committee, and recommended for stock purposes.

IMPORTANCE OF PEDIGREE.

One of the most important conditions as regards the selection of breeding stock is a good pedigree. When I say pedigree I do not mean a long list of ancestors merely, without any qualifications, but a direct descent from prize-winners on both sides, or what is still better, from good milking families, as the milking qualities are inherited as much from the sire's side as the dam's. It is singular how this matter of pedigree has until quite recently been overlooked by goat-fanciers, and it is owing to the neglect of this important consideration that in so comparatively few strains can the goats be depended on to transmit their characteristics to their offspring. Goat-shows have done wonders towards bringing about a change in this respect. It frequently happens now that kids take prizes in their class, whilst either one, or perhaps both of the parents, are winning honours in another class at the same show. This was specially noticeable at the 1884 Dairy Show, where a kid exhibited by the Baroness Burdett Coutts was very highly commended, its dam winning second in the she-goat class, whilst its grand-dam had previously been the winner of a champion prize, and its great-grand-dam also a prizetaker at the first Crystal Palace Show. The sire of this kid had taken a first prize, and the sire of its dam and grand-dam had similarly won honours.* I could furnish other illustrations of a similar kind to show how an extraordinary yield had similarly been transmitted, but what I have said will suffice to show the importance of pedigree.

Breeders who desire to keep a record of their goats, should establish a private Herd Book, containing the name, date of birth, and pedigree of every animal, devoting a page to each. With my own stock I go a step further, and state by the letters P. W., M. P. W., or H. B., whether Prize-Winner, Milking Prize-Winner,

* See parentage of Rosemary in pedigree Table, page 102.

or entered in Herd Book,* or by V. H. C., Very Highly Com-
mended. To give an illustration I extract the following :—

“Queen Mab,” born May 17th, 1885. (K. Reg., No. 134.)

QUEEN MAB.		Payne's Bill.	
Rosemary. V. H. C.—H. B. (No. 1.)	Jim. V. H. C.	Champion. P. W.	Kit. P. W.
P. W. & H. B. (No. 5.)	Captain. P. W.	Daisy. M. P. W.	Unknown.
Duchess.	P. W.	Torrie.	
P. W. & H. B. (No. 4.)	P. W.	Nelly.	
		General. P. W.	
		Polly. P. W. & H. B. (No. 4.)	Duke. P. W.
			Nan. P. W.

Notes : Queen Mab, Rosemary, Daisy, and Nan horned goats, the remainder all hornless.

The above is the usual way of showing pedigrees without using the words “dam,” “grandam,” “great-grandam,” &c. The

* This refers to the Herd Book of the British Goat Society.

divisions and sub-divisions show the parentage as the genealogy extends, the sires being always entered on the right hand and the dams on the left in each division. Thus the pedigree will read: Queen Mab out of Rosemary by Jim, who is out of Daisy by Champion; Champion being out of Kit by Mr. Payne's Bill; Rosemary out of Duchess by Captain, and so on. The pedigree I have selected is interesting as showing how, whilst most of the ancestors are hornless, a horned goat is produced.

PREGNANCY.

As I remarked in a former chapter, a goat may have all the appearance of being in young, and yet be nothing of the kind. The fact may, however, be ascertained at six or eight weeks before the time of reckoning arrives, by pressing the fingers against the animal's flanks, when a hard lump may be detected, which is the head of the kid; when it is felt no doubt need be entertained of the result.

Throughout the period of pregnancy a goat should be liberally fed, but as the time for parturition draws near, that is within a fortnight of the day on which the kids are expected, care must be taken that the animal is not fat, as high condition at this time is liable to produce inflammation at the birth, which may terminate fatally. To avoid this the rations should be reduced in quantity, and only those of a laxative nature supplied; such as potatoes or turnips, and bran slightly moistened with water. A bran-mash may be advantageously given every other morning, as it keeps open the bowels.

Goats as a rule drop their kids easily, and in nine cases out of ten without accident; such a thing as a goat dying at the event, even when the young are born dead, being quite the exception. It is quite surprising the amount of butts and blows these animals are capable of receiving while pregnant without experiencing any ill effects. It would almost seem as though nature had especially provided against all such casualties.

It is, nevertheless, advisable to take extra care of goats in kid, to prevent all chance of abortion, for if one goat slips her kids through some unforeseen circumstance, others in the same stable are very apt to follow her example without any apparent reason. They should, therefore, be driven, or led gently, and not allowed to take violent exercise, as much exertion at this period is prejudicial. For the same reason no dogs or other animals likely to cause a fright should be permitted to approach. Goats that live on a common are generally more hardy than such as are kept constantly in a stable. The former will often drop their kids under a furze-bush, and after licking them over, partly cover them with ferns and go on browsing, returning at intervals to suckle them. One that has been more delicately reared, however, requires more careful treatment. As the day of its expected accouchement draws near, a separate place should, if possible, be prepared for the dam, where she may move about at will, as it is important that she be not fastened in any way.

Signs of approaching parturition are shown by the enlargement of the vulva; the goat becomes restless, and lies first in one place and then another, frequently changing positions; she also bleats a great deal, and her udder becomes rapidly harder, being more replete with milk. When this is noticed she should not be taken out to graze, but kept in the stable, where a good bed of fresh straw, a bucket of clean water, tepid, and good sweet hay should be provided for her.

TREATMENT AFTER KIDDING.

While giving birth to the kids a goat is best left to herself, as these animals rarely require any assistance. As soon as it is over, which may not be the case, if there be several, for an hour or more (thirty or forty minutes elapsing in some instances between the birth of each), the mother should have a bran-mash given her, and a drink of oatmeal-water, made

by pouring boiling water on a handful or two of coarse Scotch oatmeal, and allowed to stand until lukewarm. The mash is made by pouring boiling water over a quart or so of bran until thoroughly wet, without being too sloppy. It is necessary in each case that the water actually boils. The first act of the newly born kids upon gaining their legs, which they do, if healthy and strong, almost as soon as they are into the world, is to make for their mother's teats. These they are sometimes slow to find; but that is of no consequence, as they do not actually require nourishment for several hours. If the udder be full of milk, however, a portion should be drawn away, as the great weight and pressure will cause the mother pain, and if the milk be not removed is apt to form clots, and produce inflammation; when this happens, as will be noticed by the great heat of the bag, it should be fomented with hot water, and rubbed over with vaseline, being well worked in the hand. As soon as the milk comes freely the kids should be put to the mother, and if they do not then suck properly, the teats must be placed in their mouths; once they have drawn a few drops, they rapidly improve the occasion, and do not often require a second lesson.

For the first three days the milk that comes from the udder has a highly yellow appearance, and having a considerable proportion of mucus in its composition is not fit for domestic use. Upon the kids, however, it acts medicinally as an aperient, and is very beneficial. It assumes its ordinary character in three or four days, which may be known to be the case when it froths up on being drawn.

During cold weather it is better to keep the kids shut up with their dam in the goat-house. But should the days be fine and dry, especially in spring and summer, they may be all put out the second day. With good milkers it often happens that the kids, if only two in number, do not take all the milk that the mother yields; in which case it is advisable to draw off a portion daily, otherwise the supply may be naturally lessened.

The goat requires careful watching the first day or two to see that both teats are properly drawn for some time. When there is only one kid, and the goat is a heavy milker with unusually large teats, the kid will often suck one teat only, leaving the other untouched. The result is, that the neglected teat gets very distended, and if allowed to continue in such a state, becomes corded by the milk clotting inside, and is rendered useless for ever after. The simple prevention of such an issue is to milk the teat regularly night and morning until the kid takes to it, which it will generally do after a few weeks when it can consume more milk.*

* As a case in point I may mention a goat I am now milking, the kid of which, just six weeks old, has from its birth sucked only one teat, whilst I draw a pint three times a day from the other.

CHAPTER X.

REARING KIDS.

WEANING.

THE common practice is to commence weaning kids at about six weeks old, but if fine stock are required they should be allowed to suck as long again, this being the great secret for gaining size. The weaning process should be a gradual one, the kids being at first separated from their mother during the day and put to feed where they will find some young and tender grass and herbs. They will eat such food very readily at six weeks old, as they begin to make use of their teeth when only a fortnight old, and sometimes even earlier if the milk supply is scanty. When the separation can be made to take place at a distance from the owner's residence he will find it beneficial, for his own sake, as the frightful noise these youngsters and their fond parent set up when they discover themselves parted, is enough to make a nervous and impetuous individual put an end to the existence of the 'lot in the most summary manner possible. When separated at a sufficient distance to prevent their hearing each other's cries, however, they soon get accustomed to their position. After six weeks, before the goats and kids are placed together at night, if the milk is much wanted the goat may be relieved of a portion of her milk, allowing the kids afterwards to take what remains.

As a general rule it does not pay to rear kids, especially the males, unless they are from superior stock, and likely from

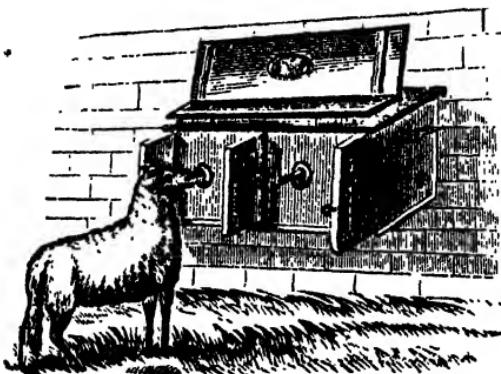
their breeding to make valuable milkers. A short calculation shows this very clearly: suppose a goat has two kids, and gives three pints a day, which is the least she should yield to bring up a couple properly, at the end of six weeks they will have taken 126 pints, with an additional 21 by the time they are weaned, in all $73\frac{1}{2}$ quarts. Reckon this at the lowest possible value, 4d. per quart, the price of cow's milk in the country, and you get 12s. 3d. as the cost of each kid; or, supposing the goat to have but one kid, and be giving a quart daily under the same circumstances, that one kid would cost 16s. 4d. Now, considering that if a nanny, it will only realise from 7s. 6d. to 10s., or if a billy, be hard to sell at 6s. or 7s., it becomes plainly evident that this system, to say the least, is not a profitable one. When it is desired to establish a herd of a good milking strain, the case is of course different. One does not then look so much at the first outlay in the hope of obtaining in the future some valuable stock. It is better to kill all "billy" kids, unless they are superior animals, at a fortnight or three weeks old, and dress them for the table. They are then delicious eating.

BRINGING UP BY HAND.

There is another way of rearing kids, and although it seems less natural it has some advantages over the ordinary one, especially for the goat. This consists in bringing up entirely by hand; it is generally practised with cows at the present day, most dairy farmers preferring to separate the calf from the cow either immediately after birth or within a couple of days, and to bring up the young animals with the pail, and milk the cow. The reason, probably, why this plan is rarely pursued by the goat-keeper is the want of separate accommodation, and the trouble involved in feeding the kids by hand, which to some would not be recompensed by the saving in cost.

Different opinions exist as to the best time to separate the

young from the dam, some holding, and with perfect truth, that the latter frets much less at the loss of her offspring if removed directly after its birth than when her affection has become deeper by suckling it. On the other hand, it is argued that the sucking of the young has a beneficial effect upon the udder and yield of milk—"drawing down" the udder, as it is expressed, more freely. For my own part, I prefer to let the kid suck for three days, or at most four, so as to let it get the "biestings" or first milk, so specially adapted to its requirements at this stage,



LACTREPHOER, FOR FEEDING KIDS.

and then to remove it and bring up by hand. The earlier this is done the easier will the kid take to an artificial teat, but during the first three days there is but little difference in this respect. As to the fretting of the goat for her young this soon subsides, if the latter be removed sufficiently far away to prevent her hearing its cries. When this cannot be accomplished, then the plan of separating at birth is best.

There are several ways of bringing up a kid by hand, but that which I have practised of late years, with the best success, combined with the least trouble, has been with a feeding machine, called the Lactrephoer, made by Messrs. Brookes and Co., of Coventry-street, Birmingham. It consists of a kind of box containing a zinc basin or reservoir, in connection with which

are tubes of the same metal, which conduct the milk or other fluid to teats placed outside, where it is readily drawn in a natural position and manner by the kids. Being made for one or more animals, as required, several can be fed together by its means with the greatest ease and with much less trouble than by using feeding bottles, as I had previously done. These, whilst answering tolerably well in the case of one or two kids, would be quite useless for a number. Besides, they get choked up in the tube, as soon as any small solids, like the bits of oatmeal in gruel, are introduced with the milk. The same does not happen with the Lactrephoer, as a strainer is fitted to the reservoir. Shallow feeding pails, fitted with teats, are also sold and much used by dairy farmers for calves, but I have never tried one. With these the animal sucks with its head down, and for this reason I consider the Lactrephoer preferable, as with it the head is held more in the natural position, the box being hung at any convenient distance against a wall.

Another way is to teach the kid to drink from a pail by introducing one hand into the milk and projecting the second finger a little above the level of the fluid as something at first to suck at, being after a time entirely withdrawn; the other hand is used to keep down the head of the kid, but it is important not to insert the mouth of the animal so far down into the milk as to cover the nostrils. Strange to say, most of those breeders who have adopted the hand-rearing system practise this method of feeding, probably on account of the little trouble it gives after the kids have once acquired the art. I cannot personally speak in its favour, however. First, I have always found much trouble in making the animals learn to drink at this early stage of their existence, and when learnt it is, after all, injurious for them to take their food in this way. It has this serious objection, that the milk being gulped down in large draughts is introduced into the stomach without a due admixture of saliva, which performs so important a part in its digestion,

and causes masses of coagulated curd to accumulate in the stomach, producing diarrhoea, which not uncommonly ends fatally. In sucking, the saliva mixes with the milk in the mouth, and the whole goes down in a more gradual and regular manner; but, should the orifice of an artificial teat become much worn and enlarged, or the end perforated by the teeth of the kid, the same result will follow. With the Lactrephoer new teats can be screwed on when the old ones are worn out, and the only attention required is to see that too much food is not supplied at a time, and that the 'feeder' is well scalded daily, to prevent any sour milk being left in the tube or reservoir.

With regard to the food supplied, nothing is, of course, so good as the natural mother's milk, and as long as there is any to spare which is not required for use, it is best utilized in this manner. In any case, goats' milk must constitute the sole food for the first week, after which fresh cows' milk may be added in gradually increasing quantities until given alone at the end of a fortnight; a week later some good skim-milk scalded and cooled to ordinary milk temperature may be mixed with the new milk in the proportion of one-third at first, and a half a few days later. At this stage some linseed tea, peameal broth, or oatmeal gruel, may be introduced into the milk, in order to increase its feeding properties, the quantity being augmented slightly each day, until at eight weeks old the kid may have the artificial food alone. Linseed tea is made by boiling half a pound of the seed in five and a half pints of water; it takes the place in some degree of the absent cream in the skim-milk. Peameal broth is not boiled, but made into brose by pouring boiling water on and stirring until fine; this jellies on cooling, when it must be intimately mixed with the milk, so that the whole is free from lumps. I tried last year a new substitute for milk, called "Lactina," introduced by Mr. Bowick, of Bedford, and was so well pleased with it that I should certainly

recommend it in preference to either of the articles just enumerated; it is easily made and readily taken by the kids when introduced by degrees into their milk, and seems to agree with them extremely well. Kids reared by hand in this way require regular and careful feeding, beginning with a pint daily for the first three days or a week, according to the appetite of the animals, and increasing the quantity as they are able to take more; they will be far healthier, however, and thrive better with a little under feeding than with too much. One over-dose may cause scouring, which will throw them back for days. Three meals a day should be given for seven or eight weeks. At this age they will begin eating hay and grass, and may even have a few crushed oats to nibble; but the artificial feeding should still continue as long as they are willing to take it, as the cost is very trifling. Kids that are to be reared for milking should, as before stated, have as much goats' milk as can be spared, or, failing that, fresh cows' milk in preference to skim milk, and the longer the sucking period can be continued the finer will the animals become. By being accustomed to sloppy food for some time after weaning they take a liking to it ever afterwards, and, when they become goats and have kids themselves, such feeding has a great effect on the production of milk. Besides this, plenty of liquid food encourages a big stomach, and this, with a good digestion, are marked features in abundant milkers.

TREATMENT AFTER WEANING.

The treatment of kids after they are weaned must depend on the purpose they are intended to serve. Those for future stock need plenty of exercise and good feeding, as great a variety of food being given them as possible. The fact that some goats readily devour anything, whilst others are fastidious and care only for corn and hay or grass, refusing even some kinds of the former, is doubtless to be accounted for



by the way they have been brought up. For a goat to be a good milker it should be a great eater and drinker, and be so constituted by nature that the food it consumes is transformed into milk rather than into meat or fat ; hence it is that heavy milkers are usually thin, although well fed. A goat, however, is like a human being, inasmuch as it becomes satiated after a time with one kind of food, but will continue to eat with fresh avidity when something else is offered to it. Thus it is important that a goat should be early accustomed to such things as bran-mashes, grains, pulped roots, linseed cake, &c. For the first six months or thereabouts oats, crushed or whole, and bran (which are good to make bone and muscle) should be the staple food, with grass and the articles mentioned above, or some of them, supplied occasionally for a change. In introducing any new food, if disliked at first, it should be mixed in gradually increasing quantities with something that is relished. Linseed cake, for instance, should be broken up very small, and put in with the oats and bran ; pulped roots also may be mixed with bran or dusted over with meal. After the age mentioned, should the season be spring or summer, more grass may be allowed and less corn given. Green food causes the barrel to become large and develops the digestive organs ; but it must not be supplied too abundantly in early spring, nor too suddenly at any time, for fear of causing relaxation of the bowels.

Scours :—Kids are always more or less apt to be attacked by the scours, more especially if, too much food is given at a time. This may be stopped (though it should not be done too suddenly) by administering a draught, the receipt for which is given under diarrhoea in the chapter on diseases. In regard to the general treatment some useful hints were contributed by Miss Arnold some years ago in the 'Fanciers' Gazette,' which I cannot do better than reproduce here :—“The secretions should be carefully watched. For any approach to looseness give a mess of baked flour boiled up with milk or milk and water, not

too much at once, two or three times, instead of the linseed tea. Those who have no nurseries may be told that this is made by setting dry flour in an earthen jar in the oven, and shaking it occasionally till it is a deepish whity-brown. Rice milk is also good, or, for severer cases, bean-meal gruel, all given cold. If the diarrhoea has been more than light, so that the little creature has moped, drooped, and dwindled, another time of danger will arise when the return of the secretions to their natural form shows that the purging is over. Obviously much green food will be avoided. Avoid also allowing the kid to eat heartily of dry stuff or grain if it can get at what older goats have, under the notion that it wants 'feeding up.' The stomach after diarrhoea is excessively delicate; if it is overloaded the kid will cease to eat, become distended, and die, the digestive system having stopped altogether. A tiny allowance of grain—say half a gill of whole grain (it is still better bruised) at once, twice a day, or a little broken biscuit or bread, with hay, is quite sufficient after the binding drinks have been left off. Green food should be gradually reintroduced, the great principle of feeding after diarrhoea being a little at a time. Remember also to keep from damp and cold night and day." If the droppings are black, hardish, and pointed at the ends, instead of round and fairly moist, as they ought to be, there is confinement of the bowels and indigestion. A very young kid, however, on spring grass and linseed tea is not likely to be bound.

EXERCISE.

It conduces greatly to the well-being of a kid if it can be allowed full and free exercise, though on grounds that are only protected by hedges, this can seldom be allowed, for these little animals in whom the mischievous propensities of their species is inherent, soon find out where their favourite food is located, and either by jumping,—if the obstacle be a low wall,—or insinuating their small bodies through the slightest

opening, should it be a fence, rapidly make their way thither. Tethering of course may be adopted, but it should be avoided if possible for goats at this early stage of their existence. When practised, however, care must be taken that the tether be fixed free of all obstacles, otherwise in its gambols a kid is very likely to get the rope or chain caught, and strangulation may ensue. It is better never to use a cord in keeping a kid within bounds, but to employ a light chain well supplied with swivels, and to see that it works freely with the pin. If a stake is used it should never be placed above ground, but driven in so that the top becomes level with the soil. When this is neglected, the little animal is sure to wind the tether round the stick until it is so close up that it is no longer able to move. A small head-stall, carefully made to fit, is better by far than a collar.

Kids that can be allowed an enclosed yard in which to exercise at will may with advantage be supplied with some means for indulging their natural propensity for climbing and jumping. This can be very simply managed by driving a couple of posts into the ground at a certain distance apart, and nailing to them a cross piece of wood such as a six-inch plank or a round or half-round pole. A board must be placed obliquely at one or both ends to enable the kids to climb up to this rough kind of platform, the height of which should be about 3 feet from the ground.

Few would believe the amusement that two or three kids will furnish an observer when provided with such an arrangement as I have described. Indeed I may admit that I have frequently spent an hour at a time in fits of laughter, witnessing the gambols of these amusing little creatures. They soon learn to make use of their gymnastic apparatus, and after a few trials will mount the structure with a skip and a bound, each starting from opposite ends and meeting in the centre will fight for "king of the castle" like two schoolboys, trying which can push the other over; one of the two or sometimes both being butted off.

Even if the horizontal piece be a round pole peeled of its bark and slippery like a scaffold pole for instance, it will not prevent these sure-footed little quadrupeds from walking across, though the feat is performed with less rapidity. Exercise of this kind whilst highly entertaining to the spectator is most beneficial to the kid ; it develops its muscles, strengthens its joints, and by promoting circulation encourages health, besides in cold weather keeping the animal warm.

CHAPTER XI.

MILKING.

MILKING is not so easy an operation as at first sight may appear, and it is only properly learnt after some little practice. There are two ways in which it may be performed—the one being termed “nievling,” and the other “stripping.” The former is that generally practised by milkmen and dairymaids, and is certainly the better of the two. It is effected by firmly grasping the teats, one in each hand, and gently but rather quickly forcing them down, at the same time closing the fingers upon them, the pressure commencing with the first and terminating with the little finger. As soon as the stream thus caused to flow has ceased, the grasp is slightly relaxed, and the hands sprung quickly upwards, when a fresh supply rushes from the udder, and is again squeezed out as before, the streams from each teat following so closely in succession as to sound like one continuous flow. Stripping consists in taking hold of the teat at the part nearest the udder between the fore-finger and thumb, which are slid down its whole length, exerting at the same time considerable pressure, thus causing the milk to flow in a forcible stream. This process is continued until the udder is completely emptied. Of these two modes of milking nievling is, as I have remarked, the better to practise, being done with greater comfort to the animal—resembling more, it is said, the action of sucking—and taking up less time. With some goats, however, it cannot well be accomplished, as in these cases the teats are so

small as to afford no permanent grasp for the hand ; and therefore, stripping must be performed. The latter operation is always resorted to at the termination of the milking to extract the last drops, it being easier and more effective for that purpose than nievling. Many persons also commence with it, and continue until the milk flows freely, when the other process is proceeded with. But milking cannot well be learnt from any written instructions. I would therefore advise the novice to get his milkman to come once or twice a day for a week or ten days, which he will be willing to do for a trifle, and watch him perform the operation, in order to see how it is done, proceeding afterwards with it himself under the man's supervision until he has so far mastered the art as to be able to milk "clean," as it is termed—*i.e.*, draw every drop from the udder. He must not be disheartened if at first the milk comes very slowly and only after great exertion on his part ; this difficulty will soon disappear as the goat gets more accustomed to him. He should practise on a tame, quiet animal, with a gentle disposition, as some are very troublesome with strangers, holding back their milk for a considerable time, and then only giving it in a fine thread-like stream, which takes a long while to complete the process. Goats with good-sized teats are more easy to milk than those with small ones, and should, therefore, if possible, be procured to learn on.

Two important points are to be borne in mind in milking —viz. to milk quickly and to milk clean. The former is necessary for two reasons ; in the first the milk is said to be better for being rapidly drawn, and in the second a goat will often get impatient when the operation is performed lazily, and will suddenly kick up her hind legs and overturn the pail. The importance of milking clean cannot be over-estimated, as neglecting it results in the animal soon going dry. Many a beginner will rise from his task under the impression that he has obtained all, when an experienced hand will afterwards, to

his surprise, draw perhaps another quarter of a pint or more. A very good plan to adopt is to imitate with the hand the action of calves and kids when sucking by sharply pushing up the udder with the closed fist, the teat being at the same time retained in the grasp. It is surprising the effect this has in inducing a fresh flow. The reason why it is so necessary to get at each milking every drop of liquid that the udder contains is that when any is left behind it is absorbed back into the system, serving to indicate that a proportionately less amount is required during the following interval, the consequence being that the animal rapidly goes dry.

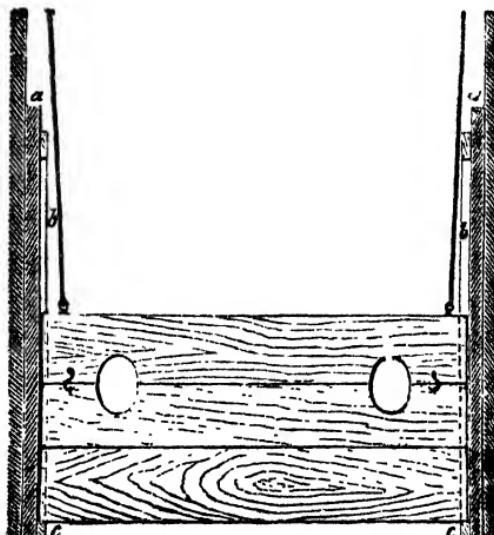
Regularity in the hours of milking is a point of great importance, if an even and constant supply be desired. Indeed, with the exception of food and water, nothing influences the yield more than this. A delay of a couple of hours, which may cause an extra quarter of a pint to be drawn, will show its effect in the milkpail during the following interval by the loss of half a pint at least, whilst an alteration of three or four hours may affect the supply for days after. A goat that gives three pints or more should, for the three first months after kidding, or as long as in full profit, be milked three times a day, at seven o'clock in the morning, one in the afternoon, and seven in the evening. Afterwards, two milkings daily, about seven a.m. and seven p.m., will be sufficient. This should be kept on until only a pint is given in the twenty-four hours, which need only be drawn once a day--every morning.

Clean milking, in a literal sense, is another matter of importance, at least in my opinion. Who has not noticed with disgust the milking of cows on a dairy farm, where the milkman goes to work with hands begrimed with dirt, on which to facilitate the process he first expectorates, and as the liquid flows squirts a few drops into his hands or dips them into the pail? Whichever he does, the result is generally the same at the termination, when the last drops that are stripped from the udder combine

with the black on the fingers, forming a muddy compound, which, when the pail is emptied, leaves a sediment of dirt at the bottom. I do not, however, mean to insult my readers by supposing they would milk their goats in this fashion with dirty hands ; it is to the teats I wish to draw their attention. These, when the animal has been lying all night on soiled litter, or during the day on muddy ground, are sure to be more or less dirty, and, if not attended to, the result must be very much the same as in the case just alluded to ; it is therefore advisable previous to each milking to go over the teats with a wet cloth or sponge of warm water until clean, and finish by wiping them dry with a cloth. The milk flows much easier after this ablution, and no fear need then be apprehended of grit showing in the pail. Indeed, in the morning I sometimes go even further than this, and add a small quantity of Condy's Fluid, which thoroughly purifies the teats from any unpleasant smell that the water alone is unable to remove. This may appear fastidious, but the rapidity with which the fluid changes colour shows that its presence is by no means unnecessary. When teats and hands are clean, a few drops of milk may be advantageously squeezed into the palms, and no unpleasant consequences ensue ; it acts as a lubricant, and makes the operation easier not only for the milker, but the milked.

Milking may be performed from behind the goat or at the side. In foreign countries, where goats are more generally utilised than in England, the former is the plan adopted. It can only be practised properly, however, with goats that have long udders and teats, but even then it does not recommend itself to me as being so cleanly or so convenient as side-milking. Most milkers kneel down to the work ; but in this position, when the operation is protracted, it becomes exceedingly tedious, not to say painful. It is far better to sit on a low stool and have the goat on a raised bench to the required level, the bench being about 2ft. from the ground. This is the plan I have

adopted of late years, and find no difficulty whatever in getting the animals to jump on to the platform after the first two or three lessons ; in fact they get so accustomed to the arrangement that at the usual hours, as soon as they are released from their stalls, they immediately rush to the milking-bench, and jump upon it without the least trouble. Of course the secret simply lies in the fact that their corn is there waiting for them, and they know it.



"GUILLOTINE" MILKING-STALLS.

It is always well to feed and milk at the same time, as it serves two purposes—if the goats are milked regularly they get fed regularly, and also stand quieter during the operation when their attention is engaged on their food. Some are, however, a great trouble to milk, especially at first, as I have before remarked ; indeed I had one that was quite six months before she would stand quietly. I tried various modes of tying her up, but to no avail ; if she could go neither forward or backward she would manage to rear up on her hind legs and then lie down altogether, rendering milking simply impossible. I accordingly

devised an apparatus which succeeded so well that I give it here for the benefit of my readers. At the head of the stable,* in front of the manger, I fastened on each side of the wall a batten (*a a*) 5ft. long, on which I nailed two pieces of wood (*b b*) to form guides or grooves. In these guides are run three boards 9in. wide and 1in. thick, the lowest within 3in. of the floor, and supported in its place by means of pieces of wood (*c c*) nailed horizontally across the bottom. The object of this space is merely to be able to rake from under the feeding-box any waste food or refuse that may have fallen and accumulated there. Two similar pieces are nailed at the upper extremity of the guides to prevent the top board from sliding out. The guides are left open in the drawing, that is to say, only one is shown on each side to allow the working of the board to be better seen. At the top of the middle plank, and 10in. from each end, a piece is cut, or rather sawn out, leaving a semi-oval opening, the one above having at the bottom a corresponding piece removed, so that when the edges meet an oval hole is formed, measuring 7in. from top to bottom, and 6in. across. The object of this, as may be readily guessed, is to hold the animal's neck, it being easily effected by sliding up the top board, and, as soon as the head is inserted over the lower one to let it drop, securing the two boards together with a couple of hooks and eyes. The upper plank is arranged by means of two weights and some sash-line run on pulleys to slide up and down like a window without any trouble or exertion. The dimensions I have given of the holes and their distance from the ground are in accordance with the sizes of my goats' necks and their heights. They may, therefore, be made larger or smaller to accommodate the animals for which the apparatus is intended.

When the milking-bench is used, these stocks require to be

* I have since erected the milking-stalls in a separate part of the goat-house in conjunction with the milking-bench described above. (See "Plan" in the chapter on "Goat-house.")

somewhat modified in construction; they are then narrower in width, one opening only being required; the sliding board works all the better for this, as it is less apt to catch at the sides. It is scarcely necessary to add that the stocks are raised to the required elevation, according to the height of the bench.

It will be found advantageous to have a bench and stocks fitted up in the goat-house, and to use them with all goats whether restive or not; the animals are then accustomed to their use, and if at any time they become restless at milking they are at once subject to control.

It must not be supposed that all goats are the same trouble to milk as the one I have described. On the contrary, as a general rule they are, after the first few times, quiet and tractable, submitting to the operation with apparent pleasure. Nor is this to be surprised at, considering the hard and distended state of the udder of a good goat previous to its being milked, and the symptoms of uneasiness the animal exhibits if the milking hour is delayed. When the milk is drawn for the first or second time after kidding, the animals are apt to be rather fidgety, but this will soon be got over with kindness and patience. And here let me remark that patience and an even temper are two most essential qualities for any one to possess who has much to do with milch stock. It is said that cows will give more milk to a gentle, kind-tempered milk-maid than to one with rough and impatient manners, and that they prefer to be milked by a woman. However troublesome and unsteady your goats may be, keep your temper as much as possible, patting and coaxing rather than punishing by blows, for much of the latter treatment is not unlikely to result in an empty pail, with the subsequent effect of the animal going dry altogether. I have certainly in some instances found a sharp stroke with a switch the only effectual cure for the habit contracted by some goats which persisted in lying down as soon as their teats are touched, but

measures of violence should only be resorted to when other and more gentle treatment has failed.

A few necessary utensils will be required for use in the "goat dairy."



MILK-PAIL.

These are a milk-pail, a strainer, a cream-skimmer, and shallow pans for containing the milk when set for cream. In milking, some persons use a round wooden bowl instead of a pail; I have tried both, and much prefer the latter, it being less easily overturned should the goat accidentally place her hoof upon its edge; and, moreover, having a flat bottom, the milk as it first descends from the teats does not run up the sides and get lost, as is frequently the case with the round-bottomed article.

I append a sketch of the proper sort of pail to use. It should be made of well-seasoned wood, the staves fitting closely together and bound with two good strong wooden hoops. Its height is 6in. and diameter 8in., holding about half a gallon. Pails of these dimensions are not easily procured ready made, as those generally kept are intended for cows, and therefore too large for the smaller animal we have to do with, they may however be procured to order at any coopers at a cost of 3s. each. After the milk is drawn, it should be strained through a fine hair-sieve. The object of straining is not so much to get rid of grit, which, as I have shown, ought not to be present, as to retain in the sieve the hairs from the udder, that in some seasons come off in large quantities.

Every utensil should be scalded with boiling water as soon as used, and afterwards put out to dry and "purify in the open air. An occasional soaking in soda-and-water is further beneficial. In very dry weather a little water should be left in the

milk-pail, as the staves are very apt to shrink from the heat, causing it to leak when next used.

GOATS SUCKING THEIR OWN MILK.

A goat will sometimes contract this objectionable habit through being neglected to be milked for a long time, and also, I believe, if allowed to become very thirsty. Whatever cause may induce it, this habit becomes very difficult to eradicate, some goats being rendered perfectly useless as milkers ever after. The usual practice is to smear ointment over the teats in which some strong and nasty tasting stuff has been incorporated, such as creosote or assafœtida. Care, however, must be taken not to use any drug or chemical that would act on the surface of the teat and cause pain or injury, and of course it will be no good to attempt to use the milk as long as the ointment remains on, because in the process of milking, unless the teat should be washed each time, and no attempt at stripping made, the milk would naturally acquire the nauseous taste intended to disgust the goat. Another and better plan consists in putting on the goat a loose collar composed of short sticks sharpened to a point at each end. These have a hole at about two inches from the points, through which a thick string is passed and fastened firmly to each stick to prevent it from sliding. When placed on the goat the sticks lay parallel with the animal's neck, but as she turns to reach her teats her neck comes in contact with the sharp ends and prevents her attaining her object. Collars like this are used frequently on horses that have been dressed with some embrocation or ointment which it is undesirable the animal should lick. A third arrangement, and this is as effective as any, consists in fixing a head-stall on the goat, the nose-band of which has sharp spikes projecting from the front. These spikes are no inconvenience to the animal whilst grazing, but as soon as she attempts to reach her udder, the points compel her to desist.

CHAPTER XII.

GOATS' MILK AND ITS UTILITIES.

FROM the earliest and most remote periods goats' milk has been used as food for man, as proved by the Scriptures, where it is mentioned more frequently than any other milk. At the present day, however, it is almost a scarcity, and on account of its medicinal properties is chiefly sought after for invalids.

Apart from its medicinal qualities, however, goats' milk is, for domestic purposes alone, far superior to the ordinary milk supplied by dairymen, as all who have tried it can testify. Boiled and used with coffee it is delicious, giving the latter a rich creamy appearance, whilst a few drops in a cup of tea are more than equivalent to a tea-spoonful of cow's milk. When used in cakes and puddings, its superiority is quickly apparent both to the sight and taste, imparting a rich yellow colour to these articles when cooked, and thereby acting economically by lessening the requisite number of eggs. Its only disadvantage for cooking purposes is its liability to curdle, which it is very apt to do if used rather old. It bears diluting well, and even when mixed in the proportion of half and half, is by no means "sky blue."

In fact the qualities of goats' milk only require to be better known to be properly appreciated. As it is, so few have tasted this valuable article that some have almost a prejudice against it, thinking, because it comes from any other animal than the cow it must be unpalatable. Many persons are impressed with

the idea that this milk has a peculiar flavour, but this impression is entirely erroneous, for when drawn *clean* from an animal in health it resembles cows' milk, both in taste and appearance, the only difference being that it is richer, thicker, and slightly sweeter, containing as it does a larger proportion of sugar and cream, and less water. (See analyses on pages 130 and 131.)

It might naturally be supposed that through being more concentrated goats' milk would be less digestible than cows' milk, but experience shows it to be quite the contrary. Its principal virtues are, its great nutritiveness, its lightness on the stomach, and consequent easiness of digestion. On this account it is frequently used for nourishing infants that have to be brought up by hand. It is also most valuable for adults suffering from pulmonary complaints or other wasting disease. For these purposes it fetches a high price, as much as 4s. per quart being sometimes paid for this valuable article, though the usual charge in London is from 2s. 6d. to 3s.

OPINION OF THE MEDICAL PROFESSION.

In order to show the high opinion in which this milk is held by members of the medical profession, I append extracts from some of the numerous letters I have received from physicians at different times.

Dr. Charles Edward Shelly, Medical Officer to Haileybury College, says: "For infants, I believe goats' milk to be the best substitute for their natural aliment, when that is for any cause not attainable. Not the least of its advantages is due to the fact that, owing to its superior digestibility, it requires less dilution than does cows' milk; and hence the child takes the requisite amount of nourishment in a smaller bulk, and thereby escapes much of the sickness and irritation which are apt to result from too frequent feeding and over-distension of the stomach and bowels. As in the case of cows' or asses' milk,

it is usually better to sweeten it with a little glycerine rather than with cane sugar, which is prone to favour fermentation in warm weather. For invalids, for convalescents, and in many of the diseases of old age, it is most valuable. In cases of impaired general nutrition, where there was nothing which could be definitely termed disease, it has proved a most useful addition to the dietary. If its use can be extended amongst the poorer classes of the community, I believe that it will not only prove a distinct boon financially, especially in country districts, but that it will be a powerful agent in tending to lessen the present lamentably high rate of infant mortality; and that it will help to lay the foundations of a stronger and more vigorous manhood and womanhood that can be expected to result from the kind of dietary which is now almost universal amongst the children of the poor."

Dr. Barnard Gould, of Birmingham, writes: "I have used goats' milk in my own household, and widely recommend it among my patients. It is my opinion that it only requires to be better known to insure its extensive use." Another medical man, a surgeon-major in the army, in a letter addressed to me last year, wrote as follows: "My experience as to the good quality of goats' milk dates many years back. I recollect the late Dr. Golding Bird recommended it to his patients, and I have seen some of my own patients get on wonderfully with it, and I think I may say two children's lives have been saved by it."

In a paper read before the members of the British Goat Society in 1880 on "Goats' Milk as a Food for Infants and Invalids," Dr. Robert Lee, one of the physicians to the Children's Hospital, Great Ormond Street, said: "I am quite certain that if a hundred children were fed on goats' milk, and compared with an equal number of corresponding ages (all circumstances being similar) who were fed on any other milk, except that of their mothers, the goats' milk children would,

in comparison at least with those fed on cows' milk, have an advantage. This opinion has been formed partly from my own observation, for the children that I have seen fed on goats' milk have thriven in the most satisfactory way, even when they had not thriven on cows' milk ; partly also from the experience of those who have kept goats and brought up large and healthy families upon the milk. I will give one instance among many that have come under my notice of the value of goats' milk as a food for young children. It was that of an infant three months old, whose mother was obliged to wean it, with the not unfrequent result of serious illness to the child. After trying the usual plans of feeding children under these circumstances, I advised that goats' milk should be tried before resorting to a wet-nurse. A quart of fresh goats' milk was obtained daily from the country, was boiled and at first mixed with a small quantity of water. The child drank between three pints and two quarts daily till he was six months old, when his father went to Pau for the winter. There was, however, no occasion to make any change in his diet, for the milk can be obtained very easily indeed in Pau, as goats are driven in herds through the town every day, and are milked before the houses. Till the age of nine months, the child was fed on nothing but goats' milk, and thrived in the most satisfactory way, having now grown into a fine boy."

Referring subsequently to these remarks, another medical man, Dr. Hewitt, of Montpelier, Cheltenham, wrote to me saying : "I fully agree with Dr. R. J. Lee's estimate of the superior value of the milk of the goat, and can write positively as to the advantage of the same for the nurture of the human infant, since all my children were brought up by hand, and for the first six months of their life their staple food was the product of the goat. A marked change was speedily noticed in their aspect when occasionally, from necessity, cows' milk had to be substituted. Moreover, I know from experience that goats' milk

is, in very many cases, more easily assimilated and has a better nutritious value than that of the cow in all low conditions of vital force and debility from chronic wasting diseases."

I might fill pages with letters of a similar kind, but what I have furnished are sufficient to show that the favourable opinion, as regards the value and utility of goats' milk, is not restricted to goat-fanciers.

COMPOSITION.

The chemical composition of goats' milk, in comparison with other milks, will be seen by the following table :—

	Goat.*	Ewe.†	Cow.‡	Ass	Woman.
Casein	4·02	5·37	4·48	1·82	1·52
Butter	3·32	3·65	3·13	0·11	3·55
Sugar	5·28	5·46	4·77	6·08	6·50
Salts	0·58	0·79(ash)	0·60	0·34	0·45
 Total solid matter	13·20	15·27	12·98	8·35	12·02
Water.....	86·80	84·73	87·02	91·65	87·98
 100·00	100·00	100·00	100·00	100·00	100·00

The above table shows goats' milk to contain more solid matter than any other milk excepting that of the sheep.

More recent investigations, however, have been conducted by the late Dr. Augustus Voelcker, from samples taken from goats exhibited at the Dairy Shows of 1879 and 1880. These have greater interest, as showing the relative value of the milks of different breeds. The animals in question were entered for competition for the Goats' Milking Prize, and were as follows :— No. 1. A cross-bred English and Abyssinian, 3 years old, having kidded 4 months. No. 2. A Pyrenean, $5\frac{1}{2}$ years, kidded 6 months; and No. 3. A hornless English, 5 years old, which had kidded 3 months. Analyses showed the composition of the three different samples to be as under :—

* This is a very poor sample, see other analyses next page.

† The analysis of ewes' milk was made by Dr. Voelcker in 1880.

‡ This is a fair average sample, but the percentage varies from 83·65 to 90·00 per cent.

	No. 1.*	No. 2.*	No. 3.*	No. 4.†
Water	82.02	84.48	83.61	80.53
Fat (Butter)	7.02	6.11	7.34	8.69
Casein	4.67	3.94	3.19	9.85
Milk Sugar	5.26	4.68	5.19	
Mineral Matter (ash) ...	1.01	.79	.77	.93
	100.00	100.00	100.00	100.00
Containing Nitrogen.....	.78	.63	.51	
Specific Gravity at 60° Fahr. 1.0357	1.0302	1.0302	1.0302	

"The cream-globules in goats' milk, I find (says Dr. Voelcker ‡) are smaller than in cows' milk, and as the milk is more concentrated than cows' milk, the cream-globules are contained in goats' milk in a more perfect state of emulsion than in cows' milk, in consequence of which hardly any cream rises to the surface on allowing goats' milk to stand at rest for twelve hours or longer. One of the samples threw up scarcely one per cent. of cream, and the two others none at all, on standing for twenty-four hours." The year following, another investigation was made by the same analyst. The goats, in this case, were both of English breed; No. 1, belonging to Professor Simonds, was 3½ years old, had had its last kid six months previous, and was due to kid again two months later. The other, owned by Mr. S. Dickins, was 4 years of age, and had been in milk for more than *two consecutive years*. The rich quality of the milk from these goats was extraordinary, more especially that of No. 1, as in the other case, owing to the length of time since parturition, its produce would necessarily be more concentrated. Nevertheless, it was remarkably rich, as will be seen by comparing the results with those of other goats previously given (excepting No. 4).

† No. 4, which I append to Dr. Voelcker's tables, shows the constituents of a sample of Angora goats' milk recently analysed by Mr. F. J. Lloyd, F.C.S. at the instance of the British Goat Society. This goat is one of those mentioned on page 45, which has since come into my possession.

* ‡ Journal of the Royal Agricultural Society of England, vol. XVI. (second series), Part II., No. 32.

	No. 1.	No. 2.
Water	80.76	80.24
Fat (pure Butter).....	8.78	9.08
Casein and {	9.60	9.83
Milk Sugar { .....	.86 .....	.85
Mineral Matter (ash)	100.00	100.00
Specific Grav. at 60° F.	1.0338	1.0343

Whilst writing on this subject, I have received the analyst's report on the milk of goats competing for the milking prize at the Dairy Shows of 1883 and 1884, and as these tables show some further variation in the composition of the milk of goats of different breeds or varieties I add them here :—

1883.			1884.	
Breed or Variety.	Nubian and Brit. sh.	Irish.	Crossed English and Irish.	English-Scotch.
Age Period of lactation	7 years 2½ months	7 years 3 months	4 years 4 months	3½ years 5½ months
Analysts.	Water Butter fat Casein and { milk sugar { Mineral matter (ash) {	85.31 5.87 7.86 .96	87.61 8.23 8.47 .69	86.08 5.09 7.99 .84
Total	100.00	100.00	100.00	100.00
Specific gravity	1.032	1.032	3lbs. 13 ozs.	3lbs.
Weight of milk *	2 lbs. 12 ozs	4lbs. 6ozs.		

It will appear from these researches that the quality of goats' milk, although generally much richer than cows' milk, varies considerably in different individuals and under different circumstances, such, for instance, as the period that has elapsed since parturition. It also shows that, like in the case of cows, the milk is richer in some breeds than in others. Thus the milk of the cross-bred Nubian is richer by far than that of the Pyrenean, and it is probable that the pure Nubian gives milk of a still higher quality, as stated in a previous chapter, though it is not likely to be superior to the two samples of English goats' milk shown above. Some specimens of milk from Irish goats, examined by Dr. Voelcker a year or so ago, showed these, (one in particular,) to be poorer even than cows' milk, which

* Twenty ozs. by weight equal 1 pint by measure.

proves as correct the opinion generally held, that long-haired goats yield a milk of inferior quality to those with short hair.

The quality of milk varies also with the season, and according to the length of time from kidding, being less rich when the goat has kidded a month or so than when she is going dry. At each milking, even, it is not of the same consistence throughout, those portions which are first drawn from the udder being less rich than the last drops, commonly called the "strippings," which are nearly all cream. If these be put to stand in a separate vessel the difference in quality will be readily seen. Where several goats are kept it is a good plan to milk all the "strippings" into another pail, using them in tea and coffee, and keeping the other portions for cooking purposes. The reason why the "strippings" or "afterlings" are so much richer than the previously drawn portions is, that the fatty particles rise to the top of the milk as it stands in the udder in the same way as when afterwards placed in open vessels, and as the lower part comes out first it follows that the greatest amount of cream only makes its appearance at the termination; hence the advantage of drawing every drop that the udder contains.

VARIATIONS IN THE YIELD OF GOATS.

Having discussed the variations in the quality of the milk, it may be as well here to say a few words upon the quantity yielded by different goats. This considerably varies, as I have previously remarked, according to the age, the amount and character of the food, the condition of health, and to some extent the breed of the animal. In ordinary specimens, having their first kids at from fifteen months to eighteen months old, the quantity usually amounts to a pint and a half per day, in two milkings, but in very superior milkers it may be as much as three pints, or two quarts if the animal is over two years old. One that yields a pint at a meal with her first offspring need not be set aside as an indifferent animal, as she will in all probability give quite twice that quantity

on subsequent occasions. There are many goats at the present time that will milk two quarts a day for the first three months after kidding; indeed I have received positive assurance of full four quarts having been reached, but as I never myself saw a goat that gave a gallon per day, I cannot vouch for the accuracy of the statement. The largest quantity I ever obtained myself was three quarts and three-quarters of a pint, *accurately measured*, the milking being performed thrice daily, and with the utmost regularity. I should state, however, that special feeding had to be adopted to keep up this yield, the animal being naturally a voracious eater, and with an extraordinary fondness for water.

Influence of water on the yield.—The amount that a goat drinks under these circumstances has a direct bearing on the yield of milk, both in quantity and quality. It might naturally be supposed that the quality would be reduced as the quantity was increased, the addition being merely that of water, but from certain experiments that have been made by Daniel and repeated with additional precautions by Stohmann, such an assumption has, it appears, but little foundation in fact. Lecturing on this subject a few years ago, Dr. F. Soxhlet stated as follows: “A clear proof that an increased supply of water is followed by an increase in the dry constituents of milk was first afforded by Stohmann’s experiments upon goats at Halle. He took occasion at the same time to observe the influence on the bodily condition of the animals of an extra supply of water. A goat of 28 to 30 kilogrammes, live weight, consumed daily, from the 2nd to the 10th of May, 700 grammes of hay, 800 grammes of linseed-meal, and 3 litres of water. The quantity of milk it gave averaged 1418 grammes per day. On May 11th, the goat had, in addition to the usual solid food, 6.5 litres of water; on the 12th, 3.6; and on the 13th, 3.65 litres. The yield of milk for these three days rose from 1418 grammes to 1566, 1579, and 1618 grammes respectively. From an analysis of this

milk, as well as of the quantitative determination of its constituent parts, it appeared that the increased secretion was not due to an increased proportion of water contained in it, but to an actual increase of all its constituents. The composition of the milk during the period May 11th to 14th corresponded almost exactly with that which it presented both immediately before and immediately after. In reference to this point Stohmann says: "An increased consumption of water favours the secretion of milk, but is unfavourable to fattening; the production of milk requires a large conversion of albumen, and everything that increases such conversion counteracts fattening." . . . * From this it follows that if attempts are made to increase the secretion of milk by an additional supply of water, care must be taken to ensure also an increased consumption and digestion of food, otherwise the enlarged secretion will go on at the expense of the body generally; the animal will fall off in condition, and consequently soon cease the augmented yield, however much water may be given.

PERIOD OF LACTATION.

This also varies according to circumstances, the principal conditions being: regularity in the hours of milking, the entire abstraction of the milk on each occasion, and finally, the length of time which elapses between the kiddings. The generality of goats give milk in sufficient quantity to be worth drawing during seven or eight months in the year; but many will go on milking to within a month of the day they are due to kid again, provided they are thoroughly and regularly milked. Some good milkers, indeed, if they are kept from associating with the male goat, will go on yielding a pint or more a day for two or three years. There are probably many that would do this if their owners chose to let them; but it is the usual practice to let a goat have kids every year, and therefore we

seldom find one of these animals in profit for more than nine, or at most ten months at a time.

GENERAL REMARKS.

Milk, containing as it does fatty particles in a state of suspension, readily absorbs all kinds of odours ; and should therefore be kept apart from everything that can influence it in this way. For this reason it should be removed as soon as possible from the goat-house after being drawn, and put in a cool airy place.

The milk that is collected in the udder at the time of parturition is of a different character and consistence to that which flows a few days after and subsequently. It is then very high-coloured and thick, containing as it does nearly three times more casein than at a later period ; it has only a trace of sugar, no salts, but a considerable proportion of mucus. In this condition it is known as *Bestings* or *Beistyn*, and is not fit for ordinary domestic use, though some people make a kind of custard of it by placing it directly on being drawn in a pie-dish in the oven, when it readily coagulates, and when cooked has certainly a resemblance to a custard in appearance, though not in taste. Although not a fanciful dish to grown-up persons, children generally like it, especially when eaten with some preserve. It is by no means unwholesome ; but to the newly-born kid it has a slight purgative effect.

All milk when first drawn, and so long as it contains its natural warmth, is said to possess a peculiar flavour, which varies according to the animal from which it proceeds. If shut up in this state in a closed vessel, the animal flavour is to a great extent permanently retained, and the keeping qualities of the milk are impaired. It should therefore in all cases where it is required to travel, be gradually cooled down before being placed into the closed receptacle intended to convey it. When a large quantity is under operation it is best to use a refrigerator for

this purpose ; but if a small amount only is sent away, it may be aerated merely by being poured from one vessel to another in the open air, and then allowed to stand in a shallow pan surrounded by water until quite cold.

As regards its keeping properties, goats' milk is not equal to cows' milk, as it more easily curdles on boiling if not quite fresh. Although if new and good it is free from any flavour or smell of a hirsic character, if some drops are spilt, especially on wood, and not wiped off, in a few days, when decomposition has taken place, a strong goaty scent will be found to emanate from the part where the milk was spilt. In the same way a very distinct odour of a similar kind may be noticed in soft cheese made from the milk, which, in the ripening of the cheese, has undergone decomposition.

If the milk is boiled whilst still quite fresh, it will keep longer than when in a natural state ; but the flavour and some other properties are affected by it. Its keeping qualities may be considerably extended by stirring in about two grains to the pint of salicylic acid, which has the advantage of being both tasteless and inodorous. Similar effects may also be obtained by the use of the article known under the name of "glacialine," and which is, I believe, a preparation of the same chemical.

It is a singular fact that goats' milk is not influenced in its flavour by the food the animal has consumed in the same way that cows' milk is. Thus a goat may feed largely on such strong tasting articles as turnips, laurel, ivy, and even a small quantity of tobacco, without imparting a corresponding flavour to the milk.

UNHEALTHY AND POISONOUS MILK.

At times the milk that comes from a goat will be found tinged with red, especially towards the strippings, these last being of a decidedly bloody tint. When such milk is allowed to stand for a short time and then poured off, there is a

distinct sediment of matter and blood. This occurrence may be owing to a chronic and localised inflammatory action going on in some part of the udder, which has resulted in suppuration, and the discharge of matter and other inflammatory products into one of the milk-ducts instead of the udder. Although cases of this kind sometimes are sufficiently serious to require veterinary aid, I have frequently had instances when the milk has assumed its normal condition in the course of a few days, without any treatment whatever.

Milk in the udder may be poisoned by the goat eating some poisonous plant without the animal itself being affected. Although this is very rare, and has never happened in my experience, cases were recorded in the 'British Medical Journal' some years ago as having occurred in Rome. The goats in question had been pasturing in the neighbourhood of Borgo Rione, where four poisonous herbs were found on investigation to abound, viz. : *conium maculatum*, *clematis vitalba*, *colchicum autumnale*, and *Plumbago Europaea*. The persons who had partaken of the milk from these goats suffered from a kind of cholera, and although recovery took place in each case, the patients were seriously ill for several days, the severity of the symptoms being in direct relation to the quantity of milk taken. The goats themselves, strange to relate, remained perfectly healthy. On analysis of the milk of the animals, and the vomit of the persons attacked, colchicum was discovered in both, its passage into the milk being regarded as the cause of the poisoning.

GOATS' MILK FOR PUPPIES.

Goats' milk seems particularly well adapted for feeding puppies. Although in making this statement I do not speak from my own experience, I have nevertheless good authority for the assertion ; it being founded on the results of trials made by several prominent dog-breeders, some of whom believe that puppies fed with this milk are much less liable to be troubled with worms—that

pest of all breeding-kennels—than those fed with cows' milk. A correspondent writing to the 'Live Stock Journal,' some years ago, stated that after losing 75 per cent. of the puppies he bred, from these parasites, the cause of which he attributed to the use of cows' milk, he was induced to try goats' milk, which proved so successful that, at the time he wrote, he had bred more than fifty puppies without one showing a sign of worms.

Considering that there is a wide difference in the constituents of goats' milk compared with the milk of the bitch, which contains not only more caseine, but also more sugar and fat, it is somewhat remarkable that the former should agree so well with the puppy. In an article devoted to this subject in the kennel section of the Journal just referred to, the writer stated: "In looking over the table of the different constituents of the two milks, in juxtaposition to the milk of the bitch, it is evident at a glance, that although the differences are still great, yet the composition of the goats' milk more nearly approaches the one of the bitch except in the quantity of caseine; and for that reason renders goats' milk a more desirable food for puppies, being less susceptible of disturbing the digestive organs, and easier of assimilation. The greater proportion of fat, taken in conjunction with the lesser proportion of caseine and sugar, undoubtedly renders goats' milk less indigestible in minimising the quantity of curd formed in the stomach. . . . Another reason suggests itself why goats' milk should be a natural food of better quality than cows' milk, and it is this: The proportion of solids is greater in goats' milk than in cows' milk, and as those solids are in part constituted by soluble salts, such as phosphates of lime, of magnesia, and of iron, with chlorates of potassium and of sodium, and as these soluble salts are required for the formation of bone, the feeding of puppies with goats' milk gives the little animals the required substance in a form similar to the one they were having from their mother's milk."

Singularly enough, whilst writing these remarks I have received a letter from a well known dog-fancier, bearing particularly upon this subject. My correspondent, Mr. W. H. Sprague, whose name figures sufficiently often in the prize-lists of the principal dog-shows to give importance to his statement, writes:—"I thought perhaps you would be interested to know the good results I have obtained from the use of goats' milk for rearing puppies. Last year I gave a long figure for a Bull-pup—she was a grand-looking one, but small in bone and lacked strength. Having heard of the virtues of goats' milk, especially in this regard, I determined to give the pup a daily supply to see the effect. The result was, that almost from the time when this milk was added to her daily dietary she began to improve in strength and condition, and when she was twelve months old many of the old fanciers congratulated me on possessing a bitch with such grand bone. I attribute this (whether rightly or wrongly) to the goats' milk, as previously to giving it to her—up to four months—her bone was woefully small; in fact I began to despair."

Mr. W. K. Taunton, who made his name as a mastiff-breeder from his remarkable litters of puppies with which he has carried off so many honours, informs me that he attributes his success in this respect to the use of goats' milk in his kennels, having given it to his young dogs whenever he could obtain it. As Mr. Taunton keeps goats for this purpose only, it is sufficient proof that he believes in the utility of the milk. I should add, however, that this breeder does not endorse the statement made above, that puppies fed on goats' milk are free from worms, having found that most young dogs have them more or less. This matter, however, might with advantage be further experimented upon, and I trust other dog-breeders may be induced to give goats' milk a trial in their kennels, both with the view of increasing bone and size, and in order to test the question of worms.

CHAPTER XIII.

GOATS' BUTTER AND CHEESE.

BUTTER.

BUTTER may be made from goats' milk in precisely the same way as from cows' milk, but it has not that superiority over ordinary butter that the milk has over cows' milk, and as it is not so nice-looking, being perfectly colourless, and does not keep quite so well, there is nothing gained by churning it. As, however, when several goats are kept, and all happen to be in profit at the same time, more milk will probably be supplied than can be utilised in its natural state, it may, under such circumstances, be advantageous to make it into butter. I will therefore show how this may be done in a very simple manner with a bottle, by those who wish to try the experiment, and if it is found to be satisfactory it may be carried out on a more extensive scale by the use of a small churn. I should observe, however, that primitive as the means employed may appear, this plan has been practised continually by a lady friend of mine, who, with the produce of two goats made, every week, about 3 lbs. of butter, and never cared to relinquish the bottle for more elaborate apparatus.

The milkings of each morning and evening, after being strained through a fine hair sieve or butter-cloth, should be set in small pans about 4 in. in depth, holding each about three pints, and left for twenty-four hours for the cream to rise, being placed in a dairy or other cool place free from any kind of

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smell. Every morning and evening after this process has been gone through, the milk which has stood for twenty-four hours is placed on the kitchen range or stove (a closed stove being preferable) over the boiler, or as far as possible from the fire, and there allowed to remain until the surface becomes slightly wrinkled, when the pan must be removed to the dairy. And here it should be observed that the cooler the range or stove, and the longer the milk takes to scald, the thicker will be the cream. The next day, the cream which has in the meantime risen, and which should be a quarter of an inch thick, is skimmed off and placed in a white earthenware jar or basin. Twice every week this jar or basin is stood in hot (not boiling) water, until the cream is lukewarm, when it is poured into a wide-mouthed glass bottle, holding about a quart, a little annato or other butter-colouring being added, drop by drop, to obtain the required tint without which the butter will be as white as lard. This bottle, which answers the purpose of a churn, must be securely corked, and shaken backwards and forwards in a slanting position from right to left (this movement being less fatiguing than any other) for twenty minutes, by which time the butter will be churned. It is then, after the sour milk has been strained off, turned into a cloth, the ends of which are gathered together as in tying up a pudding, and put into cold spring water; running water by preference; where it is constantly pressed with the hands until all the butter-milk is extracted. This is important, for if any be left in, the butter will soon become rancid. After pressing out as much of the butter-milk as possible, the butter should be turned on to a board, or better a marble slab, where it is spread out an inch thick, sprinkled with salt, and worked about well for a minute or two. Finally, a print or box-mould, after being dipped into cold water, is used to make the butter up into little pats of about 2oz. each. If a box-mould be used, the butter should be slightly spread over the print-piece first, then drawn down

over the side, and spread round, the middle part being filled last. The mould should be afterwards placed on a dish, the print pressed firmly, the box gradually drawn up, and the print quickly removed. The pats will then be found evenly formed, though a little practice is necessary to acquire the knack of making them without holes.

In summer the milk should only stand twelve instead of twenty-four hours before and after scalding, the effect of this latter process being to separate the whole of the cream from the milk, and greatly to facilitate its conversion into butter. Indeed without this treatment the milk does not keep nearly so well, and the cream takes double the time to rise.

Besides being made from scalded cream in the way I have shown, butter may be manufactured from goats' milk in a whole state. This is done annually at the Dairy Show at the Agricultural Hall, with the milk from the goats exhibited there, and a very fair article produced, though not in my opinion equal to that made from the milk of the cows. The result, however, is less reliable, the butter being more difficult to make, and not so good as when made from scalded cream. In churning the whole-milk slightly more butter is made in proportion in consequence of a certain proportion of cream being retained in the skim milk after the bulk of the cream has risen; at the same time there is a proportion of caseine or cheesy matter, which being a nitrogenous substance is subject to rapid decomposition, thus injuring the keeping qualities of the butter. As a rule, twelve quarts of good goats' milk will make $2\frac{1}{2}$ lbs. of butter, so that a goat yielding two quarts daily will supply a pint of milk a day, besides from $1\frac{1}{2}$ to 2 lbs. of butter a week.

GOATS' MILK CHEESE.

Wherever goats are kept in large herds, as they are in Norway, the Alps, the Pyrenees, and in several of the southern departments of France, the manufacture of cheese from goats'

milk, either alone, or mixed with other milk, is extensively practised. The adaptability of goats' milk for this purpose is, indeed, evident from a glance at its composition, as shown by the subjoined analysis, where casein, from which cheese is formed, is present to a considerable extent, being nearly 1½ per cent. more than in a similar quantity of cows' milk. In this respect it is second only to ewes' milk, the constituents of which are also appended for comparison.

	Cows' Milk.	Goats' Milk.	Ewes' Milk.
Water	87·40	82·02	83·70
Fat	3·43	7·02	4·45
Casein	3·12	4·67	5·16
Milk Sugar	5·12	5·28	5·73
Mineral matter (ash)	0·93	1·01	·96
	—	—	—
	100·00	100·00	100·00

The large proportion of cream, or fatty matter, contained in goats' milk gives at the same time a richness to cheese made from it that is not possessed by any other (unless pure cream is used in the manufacture).

The varieties of goats' milk cheese are numerous, differing vastly in taste, some being extremely unpalatable—at least, according to my idea of what is nice—owing to the admixture of foreign substances, such as treacle, for instance, which forms a prominent ingredient in the manufacture of one kind of goats' cheese in Norway. It is not, however, with such that I propose to deal here, but to describe those which are made and regarded as delicacies abroad, and the sale of which is being gradually extended to this country. Such are:—Roquefort, Mont D'Or, and two less known in England, though highly appreciated in Paris, under the name of Le Sassenage and Levroux. Some of my readers will no doubt wonder why I do not include Gruyère in this category, and will be surprised to hear the reason, which is simply that Gruyère is not made with goats' milk; as so many people seem to imagine, but with cows' milk. It is difficult, indeed, to understand how this very popular error arose, unless



HORNLESS NUBIAN MALE GOAT.



ANGORA MALE GOAT.

it is owing to the fact that Gruyère cheese and goats are particularly associated with Switzerland, though both the comestible and the animal are met with, and the former also made, in other countries.

Roquefort Cheese.—A few years ago this cheese was scarcely known in England, whilst now it is in frequent consumption, being by some so highly esteemed as to be preferred to Stilton. Roquefort is made with a mixture of goats' and ewes' milk, the manufacture being originally restricted to the plateau of Larsac, where several thousand sheep and goats were kept for the purpose; but the industry has since been extended over a much greater area.

The sheep and goats are milked morning and evening, and their milk, after being strained through a cloth, is poured into a copper lined with tin, where it undergoes a certain heating to prevent it turning sour. Rennet is then added to separate the curd, the process being assisted by agitation of the mass, and the whey withdrawn. The curds are then cut up with a wooden knife, worked up into a sort of paste, and placed in cylindrical moulds of earthenware, with holes at the bottom. After the moulds have been filled to about a third of their capacity, a layer of mouldy bread is introduced, which is followed by another quantity of curd, upon which more bread is sprinkled, and so on to the top of the mould. This "*pain moisi*," as it is called, is added in order to produce the blue veins which are so highly esteemed in this cheese, and which are due to the propagation of a kind of fungus (the *pencillum gluucum*) out of the bread, which is specially prepared for the purpose. The moulds being filled, the cheese is closely pressed in them, fresh curds being taken to fill up any space rendered vacant by the compression. They are then put into wooden boxes and left in a warm, damp place, where they are turned twice a day. From here the cheeses are taken to the drying-room, where they are wrapped round with linen bands to keep them from falling to pieces,

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laid on boards, and left to dry, being frequently turned. The required dessication is effected in from fifteen to twenty days, after which they undergo a salting process. This is done by sprinkling salt upon one side of a cheese, and placing other cheeses upon it, to the number of five, and the next day reversing them and repeating the process on the other sides. They are then, after a couple of days, rubbed over with a rough cloth to rub in the salt, and placed in caves, still in piles of five, where a kind of glutinous mould forms upon them termed "rebarbe," a substance that has some value, and is sold as a tonic and stimulant to the stomach. This is scraped off, and the cheeses replaced in heaps as before for a fortnight, when they are separated and ranged in rows on their sides, and apart from each other. In this position another coating of a different kind forms upon them, which, after being scraped off, is soon followed by a third, white and blue in colour, and subsequently a fourth, this time white and red, both being removed as before. The manufacture of the Roquefort is at this stage regarded as complete, though a scraping process takes place every two or three weeks, whilst the cheeses are in the caves, and until they are sold.

These caves play an essential part in the successful manufacture of this cheese. They are for the most part naturally-formed grottoes in the calcareous rocks or mountains which surround the village of Roquefort, and are full of fissures, through which a constant and strong current of air blows, which produces an icy coolness in the place—an important feature. The various rooms in which the different processes are carried on are built over these caves.

It should be stated that at the present day the mixture of goats' milk in the manufacture of Roquefort cheese is less practised than formerly, partly, it is said, on account of the comparative scarcity of goats' milk for the purpose, and partly because it is found that cheese made solely with ewes' milk

with a flat knife. After standing one day it is firm enough to be taken out of the form. All the corners are now carefully trimmed, the knife used being from time to time washed in warm water to prevent its sticking. The cheeses are now laid flat on a board, put away in the cheese-room, and turned several times a day. When firm enough they are ready for sale. If particularly fine cheese is wanted, a little cream in the proportion of about one part to sixty of the original bulk of weight is added towards the end of the boiling process. This gives it a brighter colour, and a richer appearance and taste. A good cheese should be so firm that it can be cut into extremely thin slices with a sharp knife. It is eaten in this way on bread and butter. Each cheese weighs about three kilogrammes.

“In the preparation of *Molkenkäse*, as indeed in all dairy work, the utmost cleanliness must be enforced. Copper pans must not be used unless the whey is quite sweet, or the lactic acid will act on the metal and form very dangerous salts.”

CHAPTER XIV.

FLESH OF THE GOAT AND KID.

ALTHOUGH the flesh of the Angora goat is largely consumed, and preferred to mutton in countries where these animals abound, I should never recommend keeping ordinary kinds for this purpose; for as long as we have beef and mutton in plenty few people will care to eat goat, besides which, our present breeds are too slow growing to be adapted for this purpose. There is, however, more prejudice against this meat than is really warranted, for many people might eat a young goat of eighteen months or two years old and never realise that they were not partaking of mutton. As a matter of fact, I am told a great many carcases of goats find their way into the Metropolitan meat-market, to be there sold as "house lamb," though fetching of course an inferior price to the genuine article. Having been myself very nearly victimised in this way I can speak from experience. The circumstances of the case being somewhat amusing, besides serving as a caution, I may as well relate them here. It happened at a time of year when lamb fetches a high price, and when the temptation to offer a spurious article is therefore very great. Passing a butcher's shop, where some joints were exposed for sale marked at a comparatively low figure, I entered and ordered a hind-quarter. The serving-man took a joint from the interior without my taking particular notice of it, weighed and packed it in a rush-basket, and I carried it innocently away. Arrived at home with my "lamb," I was called into the kitchen and asked

in a somewhat quizzing manner if I was aware that I had brought home some goat for lamb. Such an assertion I of course at once repudiated, but on examination of the hoof that hung to the leg, and which was covered with brown hair without the slightest resemblance to wool at any part, together with the dark colour of the meat, the absence of fat, and diminutive size of the chops, the matter was soon placed beyond doubt. I accordingly returned next day with the meat to the butcher, and gave him very plainly to understand that he mistook his customer in attempting to palm off goat upon me for lamb. The man of course would not admit the fact, and indignantly denied the charge, endeavouring to explain that the hoof had no resemblance whatever to that of a goat. With the view of proving his statement he called out several times for "Bill." I naturally expected to see the summons answered by one of his men, but in a few minutes in trotted to my surprise a medium-sized "Billy" goat, and I was requested to compare his hoofs with the one on the leg I had bought, and to observe the difference. I made the comparison, but only to be confirmed in my opinion by the close resemblance they bore, which Mr. Butcher, however, refused to acknowledge. The fact, moreover, of a goat being thus on the premises in this part of London further strengthened my opinion. An assistant, who was busy with the meat outside, and had apparently taken no notice of what had passed, was then called in by his master and thus addressed, "Now then, Tom, you know what lamb is when you see it; what do you call that,—lamb or goat"? The man, under the impression, I suppose, that I had brought the meat into the shop for a professional opinion, after turning it over several times, said in very decided manner, "Why, that's goat, of course." I was much amused by the look of annoyance depicted on the master butcher's countenance, and the way he tried to get his man to re-examine it in order to elicit a different opinion. This of course was soon obtained when the latter saw what kind of

answer was expected of him. I told them, however, I considered the question settled, and that I must insist on my money being returned, as it was evident that the joint was not lamb. This was eventually done, the butcher consoling himself with the remark that I evidently knew nothing of either goat or lamb, a point I did not deem it worth while to discuss with him.

The meat of a full-grown goat has more resemblance in appearance to venison than to mutton, being closer in the grain, and also of a darker colour. As I have elsewhere remarked, the fat of these animals accumulates almost entirely at the kidneys, a very small proportion being deposited in the subcutaneous cellular tissue, the consequence being that this meat is somewhat dry eating, and requires well basting.

Castration in the case of the male has a very marked effect upon the quality of the meat, producing a finer flavour, and greatly increasing the quantity of fat. I recently killed a young cut billy two years old, weighing as dead meat and "sinking the offal" 40 lbs., and it was highly appreciated by all who tasted it, many mistaking it for venison. It is of course better that castration should be done while the animal is young, but it is not uncommon in some countries, and especially in Algeria, to only perform this operation after the goat has had three or four years' service, and then to eat him.

The flesh of the Angora is considered far superior to that of other breeds, and quite equal to mutton. Some experiments were made by M. Chevet at the instance of the Zoological Society of Paris some years ago, which are well worth recording here. The subject of the trial was a male Angora, which had been used for stock-getting for two years, and was emasculated at the age of three and a half, so that circumstances were somewhat against a favourable verdict, and were not improved by the fact that the goat had been imperfectly fattened. The meat, however, presented a very good appearance in its raw

state, and when prepared in various ways gave perfect satisfaction, being considered quite equal to mutton, though not of course of the first quality. "This meat" (writes M. Chevet) "is distinguished by a decidedly sweet taste, especially noticeable in the kidneys, which were grilled, and in the broth made from the neck and breast. The leg was cooked like a quarter of venison, that is to say, larded and pickled for three days, and then roasted an hour and three-quarters before a moderate fire. The saddle was braised, and though the cooking only took two and a-half hours the meat was over-done. The shoulder served as cold *roti* was prepared *en daube farcie à la gelée*: this jelly in particular left nothing to be desired for fineness of flavour, although assisted by no seasoning whatever. Every part of the animal was tried without special preparation, and fourteen of my colleagues were convinced with me that the flesh of the Angora is perfectly good eating, and under the most favourable conditions should be at least equal to the finest mutton."

Cured Goats' Meat :—It has long been the practice in Wales to cure the hind-quarters of a goat in something after the same fashion as hams, the meat under this process being called—*coch yr wden*.

I have never attempted the experiment, but Miss Arnold gives a receipt for *jambon de chèvre* which she "tried with success upon a goat past its youth, and that had been used in harness." This lady writes: "The result was such that I believe with better meat it would be superfine, and supply a real relish to the breakfast-table as long as any remained. When a goat of your herd is about to be killed, have ready in a large earthenware pan the following liquid :—Water, 3 gallons; pearlash, 1 scruple; common salt, 5 lbs.; bay salt, 3 oz.; saltpetre, 1½ oz. Mixed spice, or any one favourite ground spice, 1½ teaspoonful. The bay salt and saltpetre to be pounded and all boiled together, skimmed, and set to get cold. Lay in cold salting-solution as many joints of the goat's-flesh as it will cover.

Turn them over about once or twice in the course of three weeks, and take them out at the end. Give any one a slice of this meat when boiled, and they will ask for another. It is especially good cold. If you wish to salt the whole goat, as will be necessary with an old one, start with double the above quantity in two pans, according to size of animal. But even of an old goat the liver makes an excellent dish of fry ; and of a moderately old one the head cooked with vegetables after any receipt for sheep's head would please a Scotch taste."

KID MEAT.

Whatever may be urged against the flesh of the goat, nothing but the strongest prejudice can cause kid to be so little eaten in this country. In Italy, Spain, and the South of France it is in constant demand, and all who have lived in Malta and the East Indies can testify to the appreciation of this meat in those countries. With the Hebrews and Greeks it ranked amongst their most dainty dishes, and every one knows how frequently it is spoken of in the Old Testament.

To be enjoyed in perfection a kid should be killed before it has been weaned, or more properly before it has commenced grazing ; in other words, when about three weeks or a month old. The flesh is then very white and delicate, and when eaten cold with ham would never be distinguished from chicken. At this age the meat can hardly be said to resemble lamb, not being so close in the grain as the latter, lambs never of course being killed at this early period of their lives. At three or four months old the flesh of a kid might be taken, according to the method of dressing, either for lamb or veal, great though the difference is between these meats. A roast leg, for instance, served with mint sauce, might very readily be mistaken for the former, whilst the loin with rashers of bacon tied round and stuffed as for roast veal would lead most people to suppose they were partaking of the flesh of the calf. I have several times practised these

little deceptions at my own table on persons who I knew would be prejudiced against the dishes if presented to them without this disguise, and always with complete success. Most people prefer the "veal" imitation to the "lamb," as the meat not being very full flavoured and somewhat devoid of fat is more tasty with the addition of stuffing, and with the slices of fat bacon cooked with it. In any case it should be well basted. The remains of the joint served as a fricassée the next day make a most delicious dish.

A Public Kid Dinner :—In the year 1880, with the view of bringing the flesh of the kid into more general use, and, at the same time, of practically illustrating the various methods of cooking this animal, a public dinner was organised by the Committee of the British Goat Society at the Alexandra Palace on the last day of the Goat Show held there in July. Not only kids, however, but full-grown goats were killed for the purpose, and cooked to represent certain well-known dishes which are usually made up of other meats. Mr. Batchelor, the *chef* who had the management of this dinner, undertook to utilise every portion of the animal from the head down to the hoofs, and this was carried out to the letter, neither the flesh nor produce of any other creature being admitted, beginning with the soups and ending with the ices. Thus the meat, hoofs, suet, milk, cream, and butter of the goat or kid were each and all utilised in the various courses, the *menu* being as follows :—

POTAGES.

Scotch Broth. Billygoattawny.
De Galle.

ENTRÉES.

Kari de Lapereaux à la Madras.
Vol au Vent de Quenelles de Volaille. Fricandeau aux Tomates Farciee.
Côtelettes d'Agneau aux Concombre.

RELEVES.

Boiled Legs of Lamb and Spinach.

Mutton and Mushroom Pie. Roast Fore-quarter Lamb and Mint Sauce.

Steak and Oyster Puddings.

Chicken and Truffle Pies. Lambs' Heads Maitre d'Hôtel.

ROTI.

Roast Hares bardées, Red Currant Jelly Sauce.

ENTREMETS.

Calves' Feet Jelly. Custard.

Vanille Creams. Hot Lemon Pudding.

Ice Pudding.

It will thus be seen that amongst these various courses kid or goat's flesh was served to imitate beef, veal, lamb, mutton, chicken, hare, and rabbit, and the resemblance in some cases was so striking that only an epicure could have detected the difference. I have thought it worth while to give the *menu* in full, in consequence of the great success achieved and the universal notoriety the affair obtained at the time, this being the first attempt of the kind ever made. Reports were given *in extenso* in all the London and many of the provincial papers, and I was informed by the *chef* some weeks after the event recurred, that he had received letters from Paris, New York, St. Petersburg, and many other continental cities, asking for information as to how to cook kid in the various ways represented. So great, in fact, were the number of his correspondents that the man had serious thoughts, he said, of bringing out a book on the subject. Fawn was not represented in the *menu*, although this may easily be imitated with kid. Whilst on the subject of the *cuisine* I may as well give here a receipt for cooking kid in this fashion, which, although elaborate and costly, some epicurean reader may be glad to try,—if he can only induce his cook to follow the instructions here given.

To dress a kid to imitate fawn :—Rub the whole surface inside and out with salad oil, then put it into a pan with a bottle of port wine, a pint of vinegar, 2oz. of salt, and 2oz of treacle. Turn and baste it every day during five days. Take it out and wipe it dry and hang it up for twenty-four hours, then stuff it with the same force-meat as hare, and roast it in the following manner: Rub over it a quantity of clarified butter, and sprinkle with salt; then lay large rashers of fat bacon all over the back; cover the whole with clean letter paper and tie it on with pack-thread. Baste it continually; when more than half done remove the paper and bacon, dredge it with flour, and baste it again until it is done; and ten minutes before taking it up sprinkle some salt over it. It should be served with the following sauce: Chop a few mushrooms, shalots, parsley, a small bit of bay leaf, and the least bit of thyme. Put these into a stew-pan with a lump of butter. Let them fry for a minute or two, then add three spoonfuls of brown gravy. When this has simmered gently during a quarter of an hour, dredge in flour enough to absorb the water, and stir it for a few minutes over the fire. Then add a pint of good broth, continuing to stir it until it is boiled well together. On taking it off the fire shake in a tea-spoonful of pounded loaf sugar, and pepper and salt to taste, and squeeze in the juice of half a Seville orange.—‘ Magazine of Domestic Economy ’ (1838).

FATTENING AND KILLING.

Neither goats nor kids as a rule are easily fattened, though there are occasionally exceptions, and I have myself seen a complete barrowful of suet taken from a she-goat of four years old. To fatten a sucking kid, there is nothing equal to its natural milk, and if this is insufficiently supplied from its own dam, let it have in addition the milk of another goat. For kids that are weaned, grass during the day, with oats and bran morning and night, is the best kind of food to get them into a

plump condition. Castration of the male, and "spaying" of the female, as I have already observed, contributes very materially to the secretion of fat, rendering goats fit to kill in a much shorter space of time. These animals are easier fattened in summer than in winter if suitable pasturage can be supplied. Beans and peas, or the meal of these mixed with some Thorley's food, and added to the oats or barley, will hasten the process ; but the taste of these creatures differs so considerably that it is impossible to say what dry food is best to give to lay on flesh generally.

The best way to kill a goat or kid is to take a long-pointed knife and thrust it into the neck just behind the jawbone ; the incision should be larger on the side where the knife comes out than where it goes in, in order that the blood may flow freely without spurting out. In this manner life becomes extinct in a very short space of time. The animal should have fasted for twenty-four hours previous to being slaughtered in order to clear the intestines.



CHAPTER XV.

OTHER PRODUCTS OF THE GOAT.

GOATS' HAIR.

BESIDES the milk and flesh, which in England and on the continent are the chief objects for which the goat is kept, the hair and skin possess also a commercial value.

The hair of the common varieties is manufactured in some countries into a strong though coarse kind of fabric, and worn as garments by the peasantry. That of the shaggy kinds, especially the males, is employed for making barristers' and judges' wigs. It is also excellent for ropes that are to be used in water, as they last a considerably longer time than those made with hemp. The hair may be shorn annually about the middle of May, in the same way as the wool from the sheep.

Many goats have besides hair a very fine fleece, which on some individuals is very plentiful, coming off in the spring upon everything that the creature's coat touches. Although certainly not as valuable as ordinary wool, it is by no means useless, but the quantity on a single animal is, comparatively speaking, so small as to be scarcely worth collecting. In Russia it has long been employed for articles of dress, such as gloves, stockings, &c., and is highly valued. It is stated that on one occasion some of this wool was woven with silk into a very beautiful shawl, the texture of which was greatly admired.

Mohair and its Use in Commerce.—Mohair, the name by

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which the fine woolly hair of the Angora goat is known in the trade, must be regarded as the most important commercial product of the genus *Capra*, employing as it does in this and other countries many thousands, nay, more probably, millions of persons in its manufacture.

“ Mohair first became an article of commerce in 1749, when a branch of the Levant Company, consisting of a few Dutch and English merchants, settled in or near the town of Angora, and commenced buying mohair and spinning yarns for export; the export of the article in its raw and unmanufactured state being then prohibited by the Turkish Government. The raw article was at first purchased by them from the farmer at 1 $\frac{3}{4}$ d. per pound, and the price reaching to 2d., such an extraordinary rise in those primitive times induced the men to turn their attention to its further production. The Turkish Government, adopting its usual policy, soon placed a heavy tax on the most valuable product of Asia Minor. At the time the tax was first placed on mohair, it was worth from 3s. 6d. to 5s. 6d. per pound. Mohair was heavily taxed, whilst the wool of sheep and the hair of other goats, being much less valuable and unimportant as commercial commodities, were and are free. The result of this heavy burden, and the present reduced price of mohair, suffering as it does from the general depression of trade, is discouraging a large proportion of mohair growers at the present time, and many of them avow their determination to revert to breeding the primitive sheep and goat of the country.” *

Dr. J. L. Hayes † says: “ Mohair is not a substitute for wool, but occupies its own place in the textile fabrics. It has the aspect, feel, and lustre of silk without its suppleness. It differs materially from wool in the want of the felting quality, so that the stuffs made of it have the fibres distinctly separated and are always brilliant. They do not retain the dust or spots,

* ‘The Field,’ May 17th, 1879.

† Author of ‘The Angora Goat, its Origin, Culture, and Products’ (1882).

and are thus particularly valuable for furniture goods. The fibre is dyed with great facility, and is the only textile fibre which takes equally the dyes destined for all tissues. On account of the stiffness of the fibre it is rarely woven alone; that is, when used for the filling, the warp is usually of cotton, silk, or wool,—and the reverse. It is not desired for its softness in addition to silkiness, such qualities as are found in Cashmere and Mauchamp wool, but for the elasticity, lustre, and durability of the fibre, with sufficient fineness to enable it to be spun. . . . Its lustre and durability peculiarly fit this material for the manufacture of braids, buttons, and bindings, which greatly outwear those of silk and wool."

The chief use to which mohair is applied consists in the manufacture of Utrecht velvets, generally known as furniture plush, and largely used in France, Germany, and the United States for the linings of railway carriages, also for sofas, chairs, and table-covers. A great proportion of this Utrecht velvet is made at Amiens in France, the mohair being previously spun at Bradford, the centre of the mohair trade in England, which indeed supplies the mohair yarn for the whole of Europe. Of late years Angora wool has been extensively used in the manufacture of ladies' light dress goods, known as "brillantines" or lustres, producing a fabric which, as the names imply, has a peculiar silky or lustrous appearance. Latterly, however, the fashion having gone out for these materials—for a time only probably—the trade has greatly diminished, and the price of mohair depreciated in consequence. Amongst other manufacturers which owe their origin to mohair may be mentioned the imitation seal-skins which are now so common. To such perfection have these goods reached recently that it would be difficult without a close inspection to distinguish the imitation seal-skin from the genuine article.

Another use to which mohair is applied, and that to a considerable extent, is for dolls' hair, the fine, soft, glossy nature

of the article rendering it wonderfully adapted to this purpose. Some thousands of pounds sterling are annually spent in providing the *chevelure* for these toy babies. Finally, travelling rugs, made to imitate lion and tiger-skins, Astrachans, nigger-heads, and every variety of imitation skins, are all made from the wool of the Angora goat.

GOAT SKINS.

The operation of flaying should be performed as soon after the death of the animal as possible, for if it be delayed any length of time the hide may deteriorate in quality ; this is sure to be the case if the goat dies from disease, and has been left till decomposition has begun to take place. To remove a skin properly requires some skill and care, so as not to cut it with the knife, and at the same time leave as little flesh and fat attached to it as possible. Those who are inexperienced in such work had better employ their butcher's slaughterman, who for a trifle will kill, flay, and cut up their goat in a workmanlike manner. When the skin has been taken off, all the bits of flesh and fat adhering to it should be carefully removed with a knife, and the hide placed to dry, the hair side inward, in a covered airy place free from damp. To prevent it from shrinking, the head and tail ends should be stretched out and nailed on a board, and the leg parts spread out with skewers. Skins are sometimes preserved with salt and dried afterwards, but salt should not be used where it is intended to convert them subsequently into leather, as it never becomes thoroughly eradicated. The process of salting consists of laying the skins flat on the ground and well sprinkling the flesh side with salt and alum, more particularly on the edges and spinal portions. They are then folded by being doubled, first lengthwise down the centre, and then one fold over the other until a square is formed ; they will keep good in this manner for a considerable time, and may be dried afterwards.

Goat-skins tanned and transformed into leather are valuable for the uppers of boots and shoes, being soft, elastic, and durable, resisting the damp. To procure the genuine article is, I believe, by no means easy, and when obtainable fetches a high price, being much dearer than ordinary calf, or what is commonly called kid. Persons keeping their own goats have therefore an advantage in this respect, their only difficulty being to get their skins tanned, most tanners refusing to take in the small number that a private individual has ready at a time; consequently, unless he has a friend through whom he can get them done, he is rather awkwardly placed. As for tanning them himself, it is entirely out of the question, the process being varied and complicated, requiring at the same time a considerable amount of skill; besides which, the cost of materials would, for the few skins to be tanned, be considerably greater than their ultimate value. To tan them roughly with the hair on, for mats and such purposes, is, however, more easy, and may be effected as follows:—First, soak them in water for about eighteen hours, to get rid of all dirt and blood, frequently working them about, to more thoroughly cleanse and soften them. They should next be scraped with a blunt, thick-bladed knife and thinned on the flesh side in order to remove as much as possible those portions of animal matters which are liable to putrefaction. After this they should be steeped for ten or fifteen days in a fermenting mixture of bran and water, composed of two pounds of bran to a gallon of water. On being taken out, they must again be washed, and then folded with the hair sides in contact and immersed for ten minutes in a solution of alum and salt, in the proportion of a pound and a half of alum and a quarter of a pound of salt to a gallon of water. The quantities given are sufficient for eight skins. They are then laid out and spread on the flesh side with a paste made by adding gradually to the last mixture, while constantly stirring, first a pound and a half of wheat flour, and subsequently the yolks of half a dozen eggs, afterwards incorporating

the whole together. This paste has a softening effect upon the skins, making them also white, and counteracting any tendency to brittleness. They must be left in this state for eighteen or twenty hours, when becoming stiff they must be again rinsed in clean water, and dried by being stretched upon poles, and exposed in a dry loft, where they are left for a week or more as may be necessary. A finishing stroke may be given by polishing the skins with pumice, rubbed on as hard as possible, and finally ironing over with a smooth flat-iron carefully heated. Although this process effectually tans and preserves the skins, they cannot, of course, be expected to have that even, soft, and highly-finished appearance which those possess that are worked by a professional tanner. These effects are produced by a variety of instruments and tools, which an amateur does not possess, and which it would scarcely pay him to procure, such as fleshing-knives, softening and stretching irons, beams, &c. Skins of goats with long hair may be improved, after the first washing and rinsing process has been gone through, by laying them out on a table or board and carding the hair with a coarse wool comb, paying particular attention to any dirty spots, which should be well washed with soap. The skin of an Angora goat makes, when tanned, a most handsome mat.

Goat-skins vary greatly in quality, according to the breed of the animal ; those coming from cold climates being better, and consequently more valuable than those from southern latitudes. They are therefore adapted to different purposes, for instance, the hides of the Cape goats are most suitable for boot uppers ; those of the Angora for rugs, muffs, and trimmings ; whilst those of the English and Irish varieties, although less valuable than the kinds previously mentioned on account of being more domesticated, are nevertheless also useful for boots, furniture, purses, and coachmaker's purposes. In consequence of goatskins taking a better dye than the skins of other animals, they are used principally for the manufacture of morocco

leather, for which purpose they are tanned and dyed in a peculiar manner. It is in the form of morocco that it is employed for most of the purposes just alluded to. The skins of kids, on account of their clear and beautiful texture, are peculiarly adapted for gloves and ladies' boots, and in some parts of the continent are even made into stockings and shirts.

Horns and Suet.—The horns of the goat have been converted by some people into handles for knives and such like tools. The suet, which is generally very abundant in a full grown and well-conditioned specimen, in whiteness and quality is said to be vastly superior to that of the sheep or ox, or in fact of any other animal.

CHAPTER XVI.

THE GOAT AS A FOSTER-MOTHER.

A GOAT may be induced to bring up the kids of other goats after she has weaned her own, though these animals will not do this as readily as cows. There is no difficulty in getting a goat to take to other kids when they are put to her directly they are born, and shortly after she has been delivered of her own, but when the little strangers are brought after the others have been weaned and are removed, she generally refuses to allow them to suck, and ill-treats them. Some goats are more unmanageable in this respect than others, but when great repugnance to the new-comers is shown, the following method may be adopted, and will be found in most cases to be effective:—Place the goat it is intended to use as a foster-parent by herself for a few days, and let her udder get each time well distended before putting the kids to her. These, like most other animals, dislike solitary confinement, preferring society, especially of its kind. They will therefore more readily associate with the strange kids when there are no others to fraternize with. By allowing the udder to get distended, discomfort to the goat is produced, which is relieved as soon as the kids begin to suck, and this, in conjunction with the advantage already gained, will often lead to the goat adopting the new kids as her own. These should not, however, be left with her the first time, but removed as soon as they have had a sufficient quantity of milk, the goat being held by the horns or head-stall while the kids suck, and

only released and allowed to stand free when she no longer shows any opposition. Should any milk be left by the kids it must of course be drawn by hand. After a few attempts it will be noticed that the goat looks forward to the appearance of the kids to relieve her of her milk, and by the benign expression of her face when they are sucking, will readily show that her feelings towards them have undergone a change, after which they may be subsequently left together.

A goat will occasionally take to other kids willingly, and of her own accord, though such cases are not common. A remarkable instance of the kind came under my observation not long ago, which showed that these animals have their sympathies like human beings. This goat, belonging to Mr. B. M. Ravenscroft of Watford, a well-known goat-fancier, had given birth to two kids; but the maternal instinct in this animal seemed so imperfectly developed that she not only refused to allow her young to suck, but even maltreated them whenever they approached her. Another goat in the same stable, which had kidded some eight weeks previously, but whose kids had died a few days after birth, seemed to take pity on these ill-used little ones, and by her sympathetic bleatings encouraged them to come to her for the nourishment their own dam refused to give them. And not only this, but she evidenced the disgust she felt at the unmotherly conduct of the other goat by punishing her with her horns whenever she attempted to butt at the kids. The strangest part of the whole affair, however, consisted in the fact that this benevolently-disposed animal was out of condition at the time, and yielding scarcely any milk, so that it could not have been from any selfish desire to be relieved of the pressure of an accumulation in her udder that led her to act in this manner. On the contrary, from the way in which these little hungry creatures pulled and tugged at her teats, with the incessant bobbing up of their heads to induce a better flow, the process must have been provocative of pain rather

than pleasure. Yet would she quietly and contentedly stand chewing the cud, as satisfied and contented as though feeling happy from the knowledge that she was doing a kind action.

Goats are not unfrequently used as foster-mothers for young animals other than their own species. I have myself partly reared a calf in this way by letting it suck a large goat that gave me over three quarts of milk daily, and the calf thrived uncommonly well. The foster-mother in this case had to be held on a raised bench to enable the bovine offspring to get at her udder. Not very long ago a letter appeared in the 'Field' newspaper, with the writer's name and address appended, which stated that at Feering, in Essex, a goat which had two years before produced two kids, after these were weaned, suckled : first a young pig, afterwards two fawns, and finally two more fallow-deer fawns, which she was then fondly bringing up. All these several animals were successively fostered on her until they were weaned, and the flow was still maintained.

In South America, where large dogs are employed to guard the numerous herds of goats from the depredations of wolves and other carnivora, it is customary to rear a certain number of puppies under the goats. The natural affection thus engendered between the foster-mothers and their adopted offspring, causes the dogs to live entirely with the goats, and thus makes them more effective as guards to the herds.

The most remarkable case I ever heard of a goat acting the part of foster-mother, and which was related to me on good authority, names, &c. being given, was as follows: "A gentleman of good position was left a widower with an infant child, her mother having died on giving her birth. He was of an eccentric turn of mind, and could not bear the idea of his child being nursed by another woman, at the same time that he strongly objected to bringing it up by hand with a feeding-bottle. In this dilemma it occurred to him to obtain a goat newly kidded, and to try and train the animal to suckle the

infant after the fashion of the she-wolf in the story of Romulus and Remus. The experiment was successful, and the goat took readily to the child, running to it whenever it cried as if it were its own 'kid.' This went on, until in due course, and in order to maintain the supply of milk, the goat had a fresh lot of kids, and here the strangest part of the anecdote has to be told. This extraordinary animal showed not the slightest affection for its new progeny, but entirely neglected them in its desire to supply nourishment to the child." When the tale was related to me, the child—a girl—had nearly attained womanhood, being then in her seventeenth year, and the wonderful goat, I was informed, still lived.

CHAPTER XVII.

HE-GOATS AND GOAT-CARRIAGES.

I HAVE had occasion to refer to the male goat whilst writing on Breeding, but as this is not the only purpose that this animal serves I find it necessary to give him a chapter to himself.

The he-goat, vulgarly known as the "Billy," is not a creature to be held in much esteem or to command any great degree of admiration, owing to two objectionable attributes he possesses, viz. his disgusting habits, and the unpleasant smell which attaches to him. The former I need not particularize, let it suffice to say that an entire goat is an animal which it is best, as a rule, to keep at a distance. It is doubtless for these reasons that so comparatively few are met with. The peculiar odour emanates from the skin, and begins to be noticeable about the age of puberty, increasing as the goat grows old, and being always much more powerful at the rutting season than at any other time of the year. The scent may then in an old goat be distinguished half a mile distant, and a person touching the creature with his hands or clothes will find the smell hang about him all day.

HE-GOATS WITH HORSES.

Although unpleasant to the olfactory nerves, this odour is by no means unhealthy, but rather the reverse with animals, especially with horses, on which it is supposed to act as a preventive against the staggers. For this reason he-goats are mostly kept

by innkeepers and persons having large stables. I am well aware that some people regard this supposed connection between the hircine odour and the health of horses as absurd and ridiculous, and based simply on superstition; but for my part I cannot believe that an opinion which has been in favour for centuries with stock-owners, not only in England and the continent of Europe, but in lands still further distant, as China and Japan for instance, can after all have no foundation in fact.

Numerous are the cases that have been cited to me at various times of the beneficial effect of keeping a he-goat amongst horses, but the following being specially fixed upon my memory I give it here:—My informant was a large contractor, who having lost annually several horses by the staggers was one day advised to try keeping a “Billy.” He had always, he told me, scouted the idea that the smell of this animal could in any way influence the health of a horse, but in despair determined to give it a trial, and bought one. It turned out that for three or four years whilst the goat lived not a single death from the old enemy occurred, and thinking he had obliterated the disease once and for all from the premises and was safe for the future he did not at once replace the animal. To his dismay, however, in less than six months another death occurred in his stables from the same disorder. He then lost no time in procuring a fresh goat and no more horses died.*

The next case I have to relate came under my observation about the year 1877, when a serious epidemic which was very

* Another case almost identical with this is recorded by W. Marshall in his work on the ‘Rural Economy of Gloucestershire,’ it having been related to him by Mr. Wm. Peacy, of Northbeach, whose authority he states is indisputable. Concerning this incident Mr. Marshall further observes:—“It appears to me probable that the influence of the goat is not merely that of a charm. The staggers appears evidently to be a nervous disorder. Odours are found in many cases, I believe, to act beneficially on the human nerves, and possibly the strong scent of the he-goat may have a similar effect on those of the horse. The subject is certainly entitled to enquiry.”

fatal in its effects raged amongst the breeding studs in Surrey, and generally around the metropolis. The Middle Park and Cobham Studs lost over thirty each, and at the Shepherd's Bush and Highfield Studs only four or five colts survived out of nineteen. Mr. David Cowie, of Sundridge Hall, Bromley, who kept at the time several brood mares, some of which he had recently bought from the Shepherd's Bush Stud, all foaled down well and not a single colt was affected, although his neighbours round were complaining of losses. In this case, however, a he-goat was kept with the horses, and the owner was firmly convinced that it was the smell of this animal—and it was strong enough, as I can myself testify—which kept his stock in health. As Mr. Cowie was the only breeder who had goats and whose stud at the same time was free from the contagion, this case, combined with others, certainly goes far to prove that the popular idea is not altogether superstition.

EMASCULATION.

It is a singular fact that by the process of emasculation the character and attributes of the male goat become completely changed. He is then as free from smell as the female, and no longer practises those offensive habits which render him when entire such an object of disgust, but becomes well-behaved, docile, and tractable, so that he may be petted and led about even by children. Under these circumstances, also, he fattens readily, and if killed when between one and three years old is really extremely good eating. Not only indeed are the inner qualities of the animal altered by castration, but his appearance also undergoes a considerable modification. His horns and beard do not attain the same proportions, and his coat is much shorter than it would be if the operation had not been performed. Although he grows to a great size, he has a greater resemblance to a she-goat than to a male.

All male kids not intended for stock purposes should be

castrated as soon as possible, the best time being between two and three months old, and before the rutting season has commenced ; it may be done later, but is then attended with some risk. At this age, on the contrary, no ill effects accrue, and although the creature becomes remarkably quiet for a day or two, lies down a good deal, and does not feed so freely, he soon regains his vivacity and former appetite. If older than three months it is better that the goat should be kept apart from the rest, especially those of the opposite sex, for a week or so after ; and it is also advisable that the animal should have fasted for ten or twelve hours previous. Although the operation is a very simple one and easily performed, it should not be attempted by an unpractised hand. The services of a shepherd, or some one accustomed to operate on lambs or pigs can generally be obtained, but if not a veterinary surgeon will do it at a trifling fee.

GOAT-CARRIAGES.

He-goats that have been castrated are, when full-grown, very useful for drawing carriages, and as they possess great strength they are well-fitted for the purpose. The goats that are seen at sea-side resorts, however, are generally either females—which are worthy of a better treatment and should not be put to such a use—or else they are undersized, half-grown, wretched specimens of the other sex that are quite unequal to the task they have to perform, being objects of pity rather than admiration.

All goats may easily be taught to draw, and will learn to obey the voice and rein as well as ponies. Their education should, however, be commenced at an early age, in order to get them thoroughly under control ; the two principal requisites in their training being patience and kindness. These creatures are capricious in the extreme, at times appearing to refuse to perform what is required of them, through pure whimsicality,

which is better got over by kindness and coaxing than by any application of the whip, as the latter only frightens and makes them less tractable afterwards. The trainer must begin by making his goat lead well, putting a bit in its mouth, and the harness on its back, but not attaching it to any vehicle. This is, perhaps, the most troublesome and difficult part of the undertaking, as the animal does not at first quite understand what is required of him, and moves in any direction but the one in which he is required to go. The difficulty is overcome by practice, however, and the lesson should be gone through twice daily for an hour at a time. When the goat has acquired tolerably well the habit of leading straight, and turning to right or left by the guide of the rein, he may be harnessed to the carriage, which should not at first be too heavy, and, of course, have no occupants, the trainer beginning by leading him about, and subsequently driving him with the reins, himself walking beside or behind the vehicle. It is a good plan, where a large open space is available, to accustom the animal to the carriage and harness and to move freely by letting it go at will with the bit on and its head reined up ; this also gives it a better mouth for driving. If a goat be exercised only once a day, it should be done in the morning before it has eaten any grass, or been ~~only~~ lightly fed on chaff and corn, for some of these animals get so "blown" with green food that it is almost impossible to buckle the straps round them. They also go better on a half empty stomach than a very full one, besides which, if worked in the latter state, it spoils their wind. Domestic goats are not long-winded at the best of times, and should, consequently, not be driven fast until in good working condition, and even then, not for any length of time.

The harness should consist, besides the reins, of a bridle with bit,* a breast-strap, a pad or saddle, with crupper, belly-strap, and shaft-tug to support the shafts. Blinkers are not necessary,

* This is not always necessary.

though when used they improve the appearance of the little turn-out, as does also a nice saddle-cloth under the pad. A small collar may be used in lieu of a breast-strap, and looks more finished, but the former is easier and quicker to put on, besides being less expensive. A set of harness costs from 10s. or 15s. to £2 or £3, according to the amount and quality of the trappings. A good four-wheeled goat-carriage may be had for about £5. A Nubian or half-bred Nubian goat harnessed in a well-made cart is a most attractive turn-out. This breed is particularly suitable for the purpose owing to its great size, close glossy coat, long legs, and small horns; but for the latter and the different kind of tail it would resemble a miniature horse. He-goats are capable of trotting at a good pace. A gentleman in the United States kept two very large ones which he used to drive about in a handsomely got up chaise, often travelling in this way at no less a speed than ten miles an hour.

CHAPTER XVIII.

GOAT FARMING.*

THE foregoing chapters have reference more particularly to goat management for the purposes of a family in order to render its members independent of the ordinary milkman, but something now requires to be said about goat-keeping on a larger scale as a business. In the Mont d'Or in France, in Switzerland, and also in Norway, goat farming is carried on successfully, though under small proprietaries. In the first-mentioned locality, situated in the north-west of Lyons, some ten thousand goats are kept constantly housed and stall-fed. This neighbourhood is very thickly inhabited, the ground being apportioned amongst numerous small proprietors, whose land is so closely cultivated that pasturing is out of the question, and the soiling system has to be adopted. They are thus, as regards facilities for pasturing herds of these animals, in a still worse position than we are in England, where at least cheap grazing can often be obtained, though we have not the advantages for turning out stock to wander about at will and find their own food that the mountaineers of Norway, Switzerland and other countries have. At the same time these small farmers of the Mont d'Or receive a far less

* The greater part of this chapter on Goat Farming appeared in a series of articles published in the 'Bazaar Exchange and Mart' in 1883-4. They are reproduced here in consequence of the numerous applications subsequently made for copies of the papers in which they appeared. Some parts of what was originally written have been embodied in previous chapters, whilst a portion is here introduced as new matter.

price for their produce than can be obtained in England. These people keep on an average from twenty-five to thirty goats, each being reckoned to yield about 600 litres, or 528 quarts a-year. The milk is used almost entirely in the manufacture of the famed Mont d'Or cheese, well known and appreciated throughout France, though the greater number are sold in Lyons and Paris. The year's supply of milk from one goat is reckoned to produce 578 cheeses, which sell for 20 centimes, or 2d. each, thus placing the price per litre (1 $\frac{3}{4}$ pints) at a fraction over 2d., or little more than 2 $\frac{1}{2}$ d. per quart. The kids are reckoned to sell at a fortnight or three weeks old for 3 francs each, so that allowing a couple to every goat, the gross return from each animal is 130 francs, or in English money about £5 3s. The cost, on the other hand, for food, wages, &c., allowing for depreciation in value of stock and interest on capital sunk, is set down as £3 5s., showing a net profit per goat of £1 18s.

To give some particulars of goat farming in Normandy, I will quote from an article which appeared in the 'Milk Journal' some years ago, being a translation from the Swedish of Director Dahl of Aas. "Goats in Norway find their homes exclusively in the neighbourhood of rocky mountains and woods. In the woods they are well known to make sad havoc by gnawing the young growth of foliage. Among the mountains, on the other hand, in whose treeless pastures they can do no damage, they are in their proper place: here they seek their food on the steepest and most inaccessible cliffs. These goats are very easily satisfied in regard to their food. While in winter the sheep rely on hay and straw, the goats live for the most part on pine, juniper, or poplar bark, which is peeled from branches and small trunks, brought home for the purpose, and mixed with a little dried foliage of the same trees. Whatever part of this the goats reject is used for fuel. Although they are most at home among the mountains, where they are kept for their milk and flesh, they thrive just as well about the farm,

where they attain a greater weight than when at large. Indeed, many are kept in some parts on account of their milk, from which a well-known and highly esteemed cheese is prepared. For this purpose they have even been imported into Denmark, where they are driven to pasture with the cows, without their doing any damage to surrounding trees and shrubs, as the meadows there abundantly supply their wants.

Goats in Norway yield from 1·9 to 2·9 litres of milk daily on good keep; but on the average one cannot reckon on more than about a litre in the first months after kidding, while in September or October the milk generally dries up. The hair, although coarse and hard, is used, mixed with wool, in the preparation of the rougher kind of clothing, such as coverlets and socks, &c. Kid-skins are used in peltry; the flesh, salted and smoked, furnishes a food which is much sought after, and by many preferred to reindeer-steak. Oftentimes two kids are dropped; these are sometimes suckled for a time, but are often killed soon after birth, so as to secure the whole of the mother's milk. According to returns furnished, the number of goats in Norway in the year 1865 was 290,915, while ten years earlier they reached a total of 350,000. The gross income obtained from them yearly is taken in the return as £78,750, but this is evidently far too low an estimate; for when goats are well tended they pay at least 18s. per head; and we have known instances where 9s. per head for the cheese alone was obtained in the short space of three months. The slaughtered beast yields from 36 to 48 pounds of meat."

Goat farming has been attempted in England, in two localities to my knowledge, in one of which it is still continued, and I believe with success. The first farm was started in the summer of 1882, when the novelty of the idea created considerable interest, and a long article appeared in the 'Times,' and also in the 'Globe,' giving a description of the farm and the objects in view. It is situated on an eminence among the Surrey hills, about midway

between Leatherhead and Dorking, being seven miles from each of these stations. I paid a visit to this farm shortly after it was taken, there being then about 120 goats of a very mixed and nondescript character, most of the animals being of the long-haired Irish breed. The experiment was not a success under the management of the original proprietor, who was unable to obtain a ready sale all at once for the quantity of milk he had to dispose of, and it was subsequently sold to the Express Dairy Company, in whose hands, I believe, it has proved a profitable undertaking.

As the utilities of the goat and the high virtues of its milk are becoming known and appreciated in different localities, goat farming on a larger scale naturally suggests itself, and I have recently heard of several proposed attempts by persons having a little spare capital, which they are desirous of employing in this direction. To these and others who may follow, some hints to guide them may be serviceable, and I therefore devote a chapter to this particular branch of goat-keeping.

PRELIMINARY CONSIDERATIONS.

There are certain important conditions to be fulfilled in starting a farm of this kind, which, if ignored, are likely to result in disappointment and failure.

In the first place, it would be folly for any one to embark in this enterprise who had not had some previous experience in the management of goats, if only on a small scale, for there is a right and a wrong side to goat-keeping as to everything else.

Other considerations are the locality and the soil. It would not be advisable to start the farm in a locality where the milk has no demand, necessitating its conveyance long distances by rail. In the case of cows' milk this is not, we know, a matter of such consequence, as it has another purpose to serve, being required for ordinary consumption and culinary use, needing not therefore to be so newly drawn. With goats' milk, however,

matters are different. It does not keep so well, in the first place, and being specially wanted for feeding infants and invalids, must be delivered as fresh as possible, so that the less carriage it has to undergo the better.

In no part of England probably is the demand for goats' milk so great as in London and some of its suburbs. About Esher and that neighbourhood it has for many years been in great request, commanding a high price, the reason stated being that the exiled French King Louis Philippe and his family when residing at Claremont, drank no other milk, thereby setting a fashion for the article. Whether this was really the origin or not, it is certainly a fact that goats' milk about Esher fetches as much as 3s. per quart in summer and 4s. in winter. A man who lived on the common at Thames Ditton a few years ago and kept some fifteen to twenty goats, informed the writer that he made over £100 a year by the sale of their milk.

As a rule, however, when there is a particular demand for this article in any town, it may generally be traced to the recommendation of the medical practitioners of the district, who have been successful with its use in treating delicate children ; and when the family doctor recommends a thing, of course people are ready to give any price for it, if it happens to be scarce. Brighton, Epsom, Salisbury, and St. Albans may be cited, in addition to those mentioned above, as places specially known to the writer where goats' milk is "recommended by the faculty."

The question of soil is all important. From my own experience and that of others I have no hesitation in saying that clay is most disastrous for goats. The peculiar construction of the hoof of this animal requires that it should tread upon hard ground ; when this is not the case, and it is much exposed to wet and mud, it suffers like sheep, from foot-rot, besides other diseases, which evidently owe their origin to a wet soil. Chalk, or gravel on chalk, answer well, and if the land has a good slope so much the better.

There is another advantage with chalky soil, it is generally cheap, and although at the same time poor, so far that it grows scanty crops of grass, this is no drawback to a goat farm. The goat does not do well on rich pasture, and indeed seems to prefer the short scanty grass and herbs that are usually met with on chalky land. No better locality, taking everything into consideration, could perhaps be selected on which to establish a goat farm than some of the downs between London and Brighton.

FARM BUILDINGS AND LAND.

The soil being satisfactory, the next important matter is to obtain suitable buildings. It would certainly not answer anybody's purpose to spend much capital in the erection of goat-houses, &c., and, therefore, the only course open is to find a farm where the buildings would be suitable for goats without going to much expense in alterations. These need not be very numerous, but they should by preference form three sides of a quadrangle, opening into a well-paved or at least dry yard, wherein any portion of the herd may be admitted as desired. On most farms some such arrangement is met with, but the yards are generally badly drained and very wet and muddy in winter, in which state they would never do for goats.

A barn makes a good goat-house, provided it be thoroughly water-tight, and the floor properly laid with bricks, or better, with asphalt or concrete. Provision must be made for keeping the goats that are in kid apart from the rest, and fastening them to their respective stalls to prevent them from injuring each other with their horns, which would be liable to cause abortion. This fastening process would be very tedious if carried out with the whole herd, but by the separation suggested, this no longer becomes necessary, as the milking goats can be allowed to lie loose. There is a double advantage in this arrangement, however, as it admits of feeding those in milk more liberally. The kids and stud goats will also require

to be provided for in separate houses, the former being allowed to run free by themselves, whilst the latter are kept strongly chained up. Some warm stables should be set apart for goats at the time of kidding, where they can remain until their kids are taken from them. The usual out-buildings will, of course, be required for storage of corn and roots, the cutting of chaff, &c., and also for heating water, or steaming food. The goat-houses must be fitted with hay-racks and mangers, which may be either single and arranged against the sides of the building, or double and placed in rows in the centre. The best mangers are made with half drain-pipes, laid end to end; being earthenware, they are much more easily cleaned than wood, and there are no corners or crevices in which the food can collect and turn mouldy. They may be obtained of Mr. T. H. Simpson, Stoneware Pipe Manufacturer, Mexborough, Rotherham. The mangers should be fixed at such a level as to prevent the possibility of any of the droppings of the animals falling in and soiling the food when they turn about, whilst the hay-racks should be placed at a good height above, so that the goats can only reach the contents by standing on their hind legs. When this is done a great deal of waste is avoided, as they cannot thrust their noses sufficiently far between the bars of the rack to pull out a quantity, selecting the bits they most fancy and trampling upon the remainder, as is the case when the racks are placed low down.

An important structure is the dairy, which will, however, form part of the farmhouse probably, rather than the out-buildings. This should, if possible, have a northern aspect, and be shaded either by trees or buildings from the sun. The situation must be particularly free from anything likely to communicate bad smells, or indeed odours of any kind. The floor should be bricks or flag-stones, with shelves of slate slabs. Water should be laid on, and a refrigerator should be provided for cooling the milk as it comes from the goats. This latter

is indeed a most important matter, especially in hot weather, for if neglected, and the milk is packed for transport by rail warm as it comes from the goats, it not only keeps badly, but it has a goaty taste, which is not at all pleasant. There are various patterns of refrigerators, but Lawrence's are considered the best.

The extent of land required depends not only on the number of goats to be kept, but also on the character of the soil, and whether it is proposed to grow any crops other than grass and a few roots, &c. In some cases it would, doubtless, come cheaper in the end to grow all the corn, straw, and roots that are required, but to do this would necessitate the purchase of horses, carts, and implements to a much greater extent, and involving a far larger capital than is here contemplated. As regards keeping the herd within bounds, and preventing their damaging trees and hedges, there are two methods of doing this, one consisting in fencing off a portion of the land, and the other by the employment of men or boys as herdsmen.

FENCING.

If the extent of pasturage be not great, fencing would be the cheaper plan in the long run, though the first cost would no doubt be considerable. This is regulated, however, by the kind of fencing employed. Wooden hurdles are cheap, but not very lasting, and unless made specially for the purpose, and quite 5 ft. high, with the lower rails within six inches of each other, would not be very efficacious; indeed, a better kind for goats are those known as "wattled" hurdles, consisting of split hazel interwoven. These form a protection against wind, but they are not so lasting as the others, and will not stand removing and replacing to the same extent. Wattled hurdles are sold in lots of 10 dozen; being £4 10s. for the 120, including stakes. Where furze can be obtained in abundance, ordinary cattle-hurdles will answer, with good stout branches of furze interlaced between, and firmly fixed

in the same way as for hurdle-jumping with horses. The bushes should be cut in the autumn, and not whilst the young sprouts are growing, as these would soon be nibbled off, and the thickness of the fence thereby reduced. Some years ago, Miss May Arnold, writing on goat-tending in the 'Fanciers Gazette,' recommended a strong durable fencing, which she described as follows:—"The best goat fence, and indeed poultry fence too, I know, when folks have a mind to be choice, consists of strong laths of home-grown wood (not deal), bound together by two or three lines of strong wire. This fencing, which rolls up, and is sold in bundles, is 'dipped in a preservative, so that it requires no paint; it is beautifully light, strong, and secure. Travellers on the western railways of France will remember hundreds of miles of it, showing off its peculiar property of adapting itself to the ups and downs of the ground, and many a brown or yellow hornless goat browsing behind it off gorse and broom along the lines. It is a pity it is not imitated or better known in England, but it can be had from Bordeaux through Messrs. Dray and Taylor of London Bridge. It is exceedingly cheap, and easy for any one to put up. The only fault to be found with it as a goat fence is that a goat wearing a collar might catch it in the points of the laths when standing up against it, but this fence may be got just too high for this, or the collar disallowed."

There is yet another fence to be described, and although

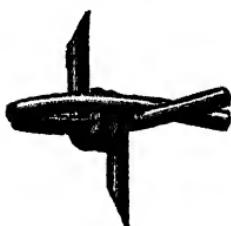


FIG. 11.

costly it is the most effective and lasting of any. This is the "barbed" wire fencing patented by Felten and Guilleaume, and sold by W. F. Dennis and Co. of Leadenhall House, London. It consists of two or more strands of strong twisted wire, having short-pointed barbs

of the same material projecting at right angles, as shown in the subjoined illustration, Fig. 11.

The wire is strained from posts placed 15 yards apart by means of a lever strainer, as shown at Fig. 12.

This barbed wire has a great advantage over plain wire, especially for goats, as these animals cannot introduce their bodies between owing to the pricks they receive when attempting it, and furthermore it keeps dogs from making their way into the inclosure. The wire is made with two or four barbs,



FIG. 12.

and costs in the former case 10s., and in the latter 11s., per 100 yards. Four lines of the two-barbed wire to enclose a mile costs £37, including the reel on which it is packed, and galvanized steel staples. A single length of this wire is very useful stretched about a foot from the top of any ordinary hurdles which are fixed for a permanence and not high enough alone. The barbs in the wire prevent the goats jumping over or through, which other wires will not; for I have known these animals when they found it impossible to jump wattled hurdles with the common wire over them at a run, take a standing jump so as to get all four feet together on the top, then dipping their heads under the wire jump down on the other side. A very good fence for goats is made with the three lower wires of barbed

fencing and the top of ordinary wire. The latter is too high to be passed through, and it cannot be jumped, there being nothing for the goat's feet to rest on as when hurdles are below. One kind of fencing which should never be used with goats, is wire-netting; for however strong it may be, a goat will entangle its horns in the meshes and soon destroy it.

HERDSMEN.

The other method alluded to for keeping goats in bounds consists simply in employing boys to watch them with long whips. It was adopted successfully at the goat farm in Surrey at the time of my visit, when two men were found sufficient for nearly a hundred head of goats.* It was then autumn, however, when the hedges do not present such an inviting appearance to these animals; in spring, the temptation to browse would be so irresistible that it is questionable whether double the number of attendants would suffice unless they had dogs trained to assist them. But dogs are not to be recommended with goats as they are with sheep, the goats being less afraid of the dog, and more disposed to show fight. The employment of a single goat-herd would be sufficient if the farm were situated on a vast plain or plateau with almost unlimited pasturage, or on downs; and if such a situation could be procured it would of course be a great point gained. But these spots are rarely to be found in England within a reasonable distance of a railway station (a condition not to be overlooked), and therefore it is almost useless to expect it. I should state, however, that in localities where anything like an extensive pasturage is presented, with few hedgerows or natural fences, a herd of goats will browse together with but little trouble, especially if a he-goat is amongst them. A bell, in the latter case, may with advantage be hung round his neck.

* A writer on Angora goats states that "One shepherd with a good dog can readily attend 1000 head during the summer months." That is, however, where there are no hedges.

STOCKING THE FARM.

Any one entering on a farm will have to be guided at first not so much on what number of goats the land will keep, but on the quantity of milk he is able to dispose of, increasing the herd as the demand improves ; otherwise the loss entailed on what is wasted will rapidly reduce the profit on what is sold. This brings up another point, which has not yet been considered, but which is of no small importance, viz., the season of the year most suitable to commence this new enterprise. The best time to enter on the farm would undoubtedly be at the February half-quarter. The reasons are several : First, the most expensive and least productive part of the year is past, and the most profitable close at hand. Secondly, the kidding season has commenced, and milking goats are becoming every day more plentiful, and consequently cheaper, so that the herd can be increased much more readily if desired during the following months than in the autumn or winter. And lastly, it is not too late to insure success in mating, so as to have fresh goats coming on in milk in July and August as the early ones are drying off.

It is usual to reckon six goats as a fair number to an acre of grass, but as kids have to be reared besides a few other animals necessary to be kept on the farm, it would be unadvisable to stock the farm in this proportion, especially if stall-feeding were practised, in which case an acre of good grass land would feed a dozen goats.

In the selection of the stud goats two should be purchased for immediate service, and be between two and three years old, and the third should be a yearling for future use. It would be advisable for one to be of the polled English breed to mate with hornless females, as the more of these that can be bred the better, not only because they are, generally speaking, better milkers, but also on account of the ready sale they command from being less dangerous with children. The other stud goat may be a

Nubian, or at least partly bred Nubian. This crosses well with the British breeds, improving the richness of the milk, and giving a better aptitude to put on flesh. On a dairy farm, whether for cows or goats, the great object in breeding is, of course, to raise good milkers; in selecting the breeding stock, therefore, the first consideration must be to obtain animals that are descended from good milkers, and the further this attribute can be traced the surer will it be transmitted. To purchase a large number of she-goats within a short time, all having this desirable characteristic, would be practically impossible, and therefore it is the more necessary to secure it in the males, by whom it will be disseminated throughout the future stock.

With regard to the females, as just observed, it will be impossible to secure a very choice herd all at once, and therefore, after a few have been specially selected for breeding, the remainder must be as good as can be got at reasonable prices, to be weeded out by degrees. The bulk of the herd will probably have to be Irish, as these are cheapest and the most easily procured. Independently of this, however, they have some good qualities, being hardy and often capital milkers, though their milk is rather poor for goats' milk. Cross-bred Nubian goats should also be selected when opportunities occur, as they yield good rich milk and plenty of it.

Dry goats that are not in kid, some of which must be included in the stock selected, can generally be had cheap enough. Many persons who have bought a goat or two in the summer for milk, and who have no opportunities for getting them in profit again, are glad to part with such animals at a low price, and as many as may be required can generally be picked up for £1 each. The expense of carriage by railway adds greatly to the cost; but where a lot of goats can be bought in one locality, they can be sent at a very much reduced rate in a cattle truck, when the cost for a dozen will be little more than for two or three sent singly by passenger train.

A word or two as to prices may not be out of place here. This greatly depends of course on the quality of the animals, but also in some degree on the neighbourhood where the purchase is effected. Goats are generally dearer in London, unless bought at a market or sale by auction, where they go pretty cheap. Private breeders and dealers can always obtain better prices there than are made in the country, probably for this reason, that a greater demand for both goats and their milk exists about London than anywhere else, whilst at the same time they are of better quality, both facts being due to the number of goat shows that have been held in and around the metropolis of late years. It is seldom that a good average specimen can be bought in London in full milk or about to kid for less than £2, whilst £2 10s. is often obtainable. These prices, however, unless something quite out of the common were offered, would hardly answer where a number have to be purchased, and therefore dependence must be placed more on the country, where very fair animals may be had for 30s. or 35s. each. The best plan would be to commission some one who may be trusted, and who understands his business, to purchase a certain number at a given price per head, with this condition, that there should be no goats over four years old at the most. I may here mention the name of Mr. W. Duckworth, of 19, Ingleby Road, Holloway, a dealer in stock generally, but especially in goats; who may be thoroughly depended on to give satisfaction.

MANAGEMENT OF A HERD.

Most of what has been written in a previous chapter on management will apply equally here, but there is one matter which on a farm deserves particular attention if success is to be attained, and that is to arrange the breeding so as to ensure a supply of milk in winter as well as in summer, when the demand will be much greater, so few goats being then in profit.

*Arranging for Periodical Breeding:—*If goats are left to

themselves, whether comparatively recently kidded or not, they are almost certain to mate between September and December, and thus come all in milk together in the spring. This is very well when one or two are used privately to supply a household with milk, as the grass, if there is a meadow, or garden produce, will keep these animals in good milking condition during the best months of the year, at a trifling cost, whilst in autumn and winter they have to be fed on corn. On a farm, however, matters are different, the sale of the milk being the principal consideration; the article should be forthcoming when the private goat-keeper has no longer his own goat to depend upon, and is obliged to buy. It is then the goat-farmer should be doing the most business. The number of applications addressed to me every year after September for goats in milk, enables me to speak without any hesitation on this point.

According to my experience the months when a she-goat is least likely to come in season are April, May, June, and July; February to June being those when the kiddings can be easiest arranged. Some goats are more readily managed in this respect than others, and I believe it to be greatly due to their breeding and subsequent treatment. Those, for instance, that lead a comparatively wild kind of life, as the Irish goat, subsisting on rough and scanty food, rarely drop their young at other times than the spring; whilst an English goat that has been accustomed to be warmly and comfortably housed and teuded, and highly fed, will often breed all the year round. At the same time, although "season" may be induced, it does not always follow that when service is effected conception ensues. A miss indeed often results under these circumstances. In high feeding,—by which is meant giving such food as maize, beans, peas, cake, &c., in contra-distinction to a vegetable diet,—it will frequently happen, because the treatment has been too generous or too long continued, and the animal has accumulated an excess of internal fat which prevents her from breeding. To



ENGLISH MILCH GOAT.

encourage mating at any time it is a good plan to place a male in the company of the females, or a she-goat that is in season ; in the former case, however, he should be removed after a few days and returned at intervals.

In order to give an idea in what proportion a herd of say 200 goats should be arranged to kid at different times, a table is subjoined, showing at a glance the monthly return of goats at different stages of milking, and the quantity of milk yielded. The figures relating to the proportion of goats kidding monthly are not put forward as an actual record of what has been done with so many, but are based on personal experience with herds of from ten to twenty, and by observation of many hundreds at shows and elsewhere. The yields of milk during the respective periods may be depended upon as reliable, being in accordance with results obtained with common specimens, no extraordinary milkers being taken into account. This table will furnish those who desire to embark in the speculation of a goat farm on a large scale with a good idea of the return that may be confidently expected, and will besides be a complete and satisfactory answer to the numerous questions which are constantly being asked by would-be goat-keepers, viz. : How long will a goat go in milk ? What quantity will it yield ? How long will the supply last ?

To better understand the table, it should be mentioned that the time during which each goat is calculated to go in milk is nine months, the average yield during the first four, comprising the first period, being two pints daily. During the second period, consisting of three months, more changes are likely to occur, and the yield is estimated at $1\frac{1}{2}$, $1\frac{1}{4}$, and 1 pint respectively, making the average $1\frac{1}{4}$. The last period contains two months, commencing at $\frac{5}{8}$, and ending with $\frac{1}{2}$ pint, or on an average of $\frac{9}{16}$ ths of a pint daily. It must not, of course, be supposed that the changes take place just at these periods, but taking 196 quarts as the yield of an ordinary goat during the nine months,

TABLE SHOWING MONTHLY RETURN OF GOATS KIDDING AND MILK YIELDED DURING THE YEAR, ON A FARM OF 200 GOATS (EACH GIVING 196 QUARTS A YEAR).

MONTHS.	First Period: 4 Months. Averaging 1 qt. daily.												Second Period: 3 Months. Averaging 1 qt. daily.												Third Period: 2 Months. Averaging 1 qt. daily.											
	Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:			Having Kidded as under:								
	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.	No. of Goats in Full Profit.	Yielding in Gallons of Milk.	No. of Goats in Half Profit.	Yielding in Gallons of Milk.								
JANUARY...	25	Dec. 10	Nov. 5	Oct. 5	Sept. 5	193 $\frac{1}{2}$	55	Aug. 5	July 20	Juns 30	212 $\frac{1}{2}$	20	May 20	April 0	0	58 $\frac{1}{2}$	100	49 $\frac{1}{2}$																		
FEBRUARY	40	Jan. 20	Dec. 10	Nov. 5	Oct. 5	280	30	Sept. 5	Aug. 5	July 20	118 $\frac{1}{2}$	50	June 30	May 20	113 $\frac{1}{2}$	120	511 $\frac{1}{2}$																			
MARCH.....	65	Feb. 30	Jan. 20	Dec. 10	Nov. 5	501 $\frac{1}{2}$	15	Oct. 5	Sept. 5	Aug. 5	72 $\frac{1}{2}$	50	July 20	June 30	116 $\frac{1}{2}$	130	690 $\frac{1}{2}$																			
APRIL.....	110	Mar. 30	Feb. 30	Jan. 20	Dec. 10	825	15	Nov. 5	Oct. 5	Sept. 5	70 $\frac{1}{2}$	25	Aug. 5	July 20	42 $\frac{1}{2}$	150	987 $\frac{1}{2}$																			
MAY.....	100	April 0	Mar. 30	Feb. 30	Jan. 20	775	20	DEC. 10	Nov. 5	Oct. 5	101 $\frac{1}{2}$	10	Sept. 5	Aug. 5	24 $\frac{1}{2}$	130	900 $\frac{1}{2}$																			
JUNE.....	100	May 20	April 0	Mar. 30	Feb. 30	75 $\frac{1}{2}$	35	JAN. 20	Dec. 10	Nov. 5	178 $\frac{1}{2}$	10	Oct. 5	Sept. 5	23 $\frac{1}{2}$	145	951 $\frac{1}{2}$																			
JULY.....	100	June 30	May 20	April 0	Mar. 30	775	60	FER. 30	Jan. 20	Dec. 10	310	10	Nov. 5	Oct. 5	24 $\frac{1}{2}$	170	1169 $\frac{1}{2}$																			
AUGUST.....	70	July 20	June 30	May 20	April 0	542 $\frac{1}{2}$	100	MAR. 30	Feb. 30	Jan. 20	513 $\frac{1}{2}$	15	Dec. 10	Nov. 5	38 $\frac{1}{2}$	185	1094 $\frac{1}{2}$																			
SEPTEMBER	75	Aug. 5	July 20	June 30	May 20	562 $\frac{1}{2}$	80	APR. 0	Mar. 30	Feb. 30	33 $\frac{1}{2}$	30	JAN. 20	Dec. 10	75	185	970 $\frac{1}{2}$																			
OCTOBER ..	60	Sept. 5	Aug. 5	July 20	June 30	465	70	MAY 20	April 0	Mar. 30	310	50	Feb. 30	Jan. 20	126 $\frac{1}{2}$	180	901 $\frac{1}{2}$																			
NOVEMBER	35	Oct. 5	Sept. 5	Aug. 5	July 20	262 $\frac{1}{2}$	50	JUNE 30	May 20	April 0	262 $\frac{1}{2}$	80	Mar. 30	Feb. 30	196 $\frac{1}{2}$	165	791 $\frac{1}{2}$																			
DECEMBER...	20	Nov. 5	Oct. 5	Sept. 5	Aug. 5	165	70	JULY 20	June 30	May 20	261 $\frac{1}{2}$	50	Apr. 0	Mar. 30	96 $\frac{1}{2}$	140	513 $\frac{1}{2}$																			

TOTAL GALLONS..... 9797

EXPLANATORY NOTE.—The figures under the heading "Having Kidded, &c.," refer to the number of goats kidded each month, i. e., Dec. 10 goats (not Dec. 10th). It will then read as follows: January 25 goats in full milk, having kidded 10 in Dec., 5 in Oct., 5 in Nov., 5 in Sept., yielding together 193 $\frac{1}{2}$ gals. during the month. Also, 55 goats in half profit, having kidded 5 in Aug., 20 in July, and 30 in June, yielding together 212 $\frac{1}{2}$ gals. Also, 20 going dry, having kidded in May, and yielding 88 gals. Total goats milking in January, 100; and giving altogether 494 $\frac{1}{2}$ gals. of milk. The first column in the second period shows the months for mating the goats for them to kid in the order given, i. e., the 10 goats kidded in Dec. must have been mated the

it may safely be divided in this manner, and thus enable a calculation to be made of the return from goats in all stages of milking during each month. With selected herds of milkers this return may be very materially increased, but at starting it would not be safe to reckon on anything out of the common, leaving better results for future days.

The number of goats put down to kid during the several months are calculated partly on the natural propensity to breed in the spring rather than the autumn, which cannot entirely be prevented, and partly on an arrangement for counteracting this tendency as much as possible. Thus, during August, September, October, and November the least number of kiddings will take place, averaging not more, probably, than five per month. If more can be managed so much the better, but it is unlikely at first. On the other hand, it will be noticed that no goats are allowed to kid in April, and this is done in order to defer the breeding of these to the next two months, and so extend the period of their milkings further into the winter, when there will be less fresh kidded. On reference to the table it will be seen that, by the plan adopted, June, July, August, and September come out as the months when the largest returns in milk are made, whilst otherwise they would probably be April, May, June, and July.

Of course, in a herd of 200 goats, as some intelligent reader will point out, a certain proportion will die or slip their kids, thereby giving little or no milk ; or, again, prove barren, yielding nothing. To enter into all these particulars in the return, however, would be rendering it too intricate and elaborate, whilst they are to a great extent balanced by the higher yields of some goats that are superior milkers, only very ordinary specimens being here reckoned.

COST OF FOOD versus VALUE OF MILK.

It is far from my intention to place before the reader visions of large fortunes to be realised out of goat-farming, and therefore

the figures I am about to give, although based on actual experience with a few goats, are not, in the returns at least, calculated on the principle that if one goat yields an average of two pints a day for nine months, as some do, 200 goats will of necessity produce two hundred times that quantity. I do not in fact intend going into all the details incidental to the profit or loss on a farm of this kind. To arrive at a definite conclusion in this regard it would be necessary to consider such items as labour, food for horses, expenses of harvesting the crops, repairs, &c., which are matters affecting general agriculture, and do not come within the scope of this work. Besides, the reader who may be thinking of embarking his capital in an enterprise of this kind is supposed to be already more or less acquainted with these charges. All I propose to show here is the cost for keep of a herd *versus* the return by the sale of milk, in doing which I shall first take into consideration the expenditure and receipts attached to one goat, for the information of the private goat-keeper, and then modify the figures to suit the different conditions under which a herd would be kept, as a guide to the would-be goat-farmer.

Having at different times carefully weighed and measured the rations consumed by my own goats, I am able to state with some precision the cost. For goats that are pastured each day, with the exception of the few days during which they are housed, this amounts to but little more than the proportional rent of the land. For those not in milk this is actually the only expense for food, and at the most need not be set down at more than 6d. per week, or reckoning one day in seven for stall-feeding on account of bad weather at 7d. per week, making roughly a total for the half year of 15s. During the remaining portion of the twelve months, when the animals will be generally housed, each will consume on an average 2lbs. of hay, costing 1d. (reckoning the price at 84s. per load); about 9lbs. of roots at 20s. per ton, value also 1d.; and a feed of oats and

bran measured out in two large handfuls, and weighing, the oats $\frac{1}{4}$ lb., and the bran 2oz. ; costing together about $\frac{3}{4}d$. Grains, and many other articles enumerated in the chapter on feeding, I do not take here into account, as when these are supplied a less quantity of roots and hay will be required, and the substances I have estimated for are those which will come to the most money. I am at least on the safe side in the selection made. The sum of these items represents a total of $2\frac{3}{4}d$. Add a small quantity of oil-cake for goats that are in full yield or want feeding up, or for others whose appetites are such that the ordinary [•] rations are insufficient ; and in round numbers, in order to avoid the charge of having under-estimated my expenditure, I will set the cost per day at 3d. ; being for the six months £2 6s. 0d., or, including the previous account, a yearly expenditure for everything in the way of food at £3 1s. 0d., or in round numbers £3 per head for every goat over the age of twelve months. Up to that age, and from the time they are weaned, the feeding may be put down at 25s. It must be clearly understood that these figures represent the *extreme* cost for the reason I have stated, and that they are capable of being considerably modified. For instance, reckoning, as I have observed, six goats to an acre of grass, and fixing the rent of the land at £3 per acre, including all charges upon it (which is the utmost that it should come to on a goat farm), the cost per goat will be 10s. instead of 15s. Then, also, home-made hay will not cost £4 4s. 0d. per load, nor the roots 20s. per ton, and if these prices are set down on the expenditure side of the account, there will be a proportionate profit from the roots and hay on the other side of the ledger. Again, 2lbs. of hay and 9lbs. of roots daily will be sufficient for many of the goats during winter that are not in milk ; the expense of corn being thereby saved, and the cost of keep reduced during such time by 50 per cent. This too happens chiefly in winter, as most of the goats will be in full profit in the summer, when grass

will form the staple food. It will accordingly be seen that whereas £3 per annum may be set down as the outside cost to feed two or three goats privately (where most of the food has to be bought retail), on a farm the feeding of a herd, taking one with the other, should not exceed 35s., or at most 40s.

Let us now proceed to investigate the return in milk. A good goat will yield on an average for the first three months she is in profit, 3 pints daily; during the next three months 1½ pints, and in the last period of ninety days ¾ pint daily. This worked out brings the total yield roughly to 240 quarts. Supposing this to be utilised for household purposes, and estimated at the ordinary country price for cows' milk—4d. per quart—the value will be exactly £4. Sold, however, at goats' milk price, even at wholesale rate, the value will be double this; but it would not be advisable to reckon 200 goats as yielding this quantity, although nothing at all out of the way for a single specimen. The calculation made in arranging for periodical breeding will thus be seen to be drawn up on a very moderate scale, where 196 quarts are set down as the average yield per goat. I have myself had a goat that produced as much during the first three months after kidding, whilst the worst milker I ever kept did not give much less.

In regard to kids, it will be evident that so long as milk can be sold for 8d. per quart it will not pay to feed kids on it, and therefore where the demand takes up nearly the entire produce the kids must be reared on cows' milk bought wholesale for the purpose; being put subsequently on skim-milk and artificial food. A choice few only will be permitted to be suckled for the sake of rearing future stock. The cost of kids, therefore, need not affect the milk return on a farm. For the householder who desires to raise his own stock, the cost was shown in the chapter treating on kids in an earlier part of this work.

CHAPTER XIX.

GOAT SHOWS AND GOAT SHOWING.

THE first goat show held in England took place in connection with the Newton Abbot meeting of the Devon County Agricultural Association on the 19th May, 1875, exactly ten years ago. The prizes were given by the Baroness Burdett Coutts, who, I believe, was staying in that locality at the time, and at whose instigation these classes were formed. These were divided into short-haired, long-haired, medium-haired, and hornless goats, with a class for kids under six months old. The same year a small show was held at Ceres in Fifeshire, this being the first exhibition of the kind in Scotland. In the summer of 1875 an important show of goats took place at the Crystal Palace, when as many as 108 entries were made, the prize list amounting to £72.

In October, 1876, the first year of the Agricultural Hall Dairy Show, goats formed part of the exhibits, and have continued doing so annually down to the present time. Being held regularly each year in October, these classes are largely patronised by the principal breeders, and nowhere is there such a fine collection to be seen as at these Islington gatherings. He-goats, however, are not here admissible on account of the objectionable odour of these animals, only male kids up to nine months of age being allowed to be entered. Two subsequent shows to the one in 1875 have been held at the Crystal Palace, viz. in 1876 and 1883, the latter being under the direction of the British Goat

Society, who also had the management in part of the Alexandra Palace Goat Shows in 1880 and 1881. Classes for these animals were included at the Royal Agricultural Society's Meeting at Kilburn in 1879, also at the Herts Agricultural Association's Meetings at Hatfield in 1880 and 1881.

The introduction of goats at exhibitions of this kind near the metropolis has been imitated of late years in the northern counties. Mrs. T. Theobald Butler, of Ayton Hall, in 1882, organised goat classes in connection with a poultry, rabbit, and cottagers' produce show, at Great Ayton, near Middlesborough, whilst in 1883 and 1884, through the influence respectively of two enthusiastic and well-known breeders of goats, Mr. A. H. Megson, of Sale, and Mr. J. S. Rawson, of Thorpe, goat classes have been included at the agricultural meetings of the Altringham Society and Halifax and Calder Vale Association. These competitions for prizes have contributed more than anything else to the improved breeds noticeable in those parts where exhibitions of this kind have been held, and a vast deal of good might still be done both towards developing the milking qualities of these animals, and rendering them more popular if agricultural societies throughout the country would imitate the example set by those just mentioned, and include classes for goats in their schedules. Although the entries may be few on the first occasion, they generally increase year by year, and the exhibits always form an attractive feature, owing probably to their novelty and to the interest attaching to this miniature dairy stock.

HINTS ON ARRANGING A SHOW.

As persons desirous of getting up local shows are generally glad of information from those who have had more experience in such matters than themselves, and as in the case of goats there are several important details which if omitted often lead to unsatisfactory results, it will probably be of service if I offer a

few hints on this subject.—In the first place, goat-fanciers are often very shy of entering their stock, partly because these exhibitions are not such everyday occurrences as those of dogs and poultry, and it is not therefore so fashionable to do so, and partly because the points not being well known many people think their stock not good enough. It is therefore necessary, before deciding on the show, to communicate,—personally by preference,—with all the breeders of goats in the neighbourhood, and induce them to take part in the competition. Here I may mention that the British Goat Society is generally willing to assist in the promotion of such shows by a donation towards the prizes, and in giving advice towards carrying out the arrangements.

SCHEDULES OF PRIZES.

It is at present, and will doubtless continue to be for some years, impossible to arrange the classification according to the breeds, chiefly because there are so few pure specimens of the different varieties, and such a very small proportion of goat-keepers conversant with the distinctions. It is therefore usual to divide the classes according to the length of hair, that is to say, short-haired and long-haired goats. The first-named generally embrace the English, Nubian, and Indian breeds, whilst the last take in Irish, Norwegian, and Pyrenian, these being the most usual kinds met with. Where the number of entries is likely to be considerable it is well to provide a separate class for hornless stock. A class for foreign goats is interesting if some genuine foreign varieties can be obtained; but it generally leads to disqualifications owing to wrong entries for the reason mentioned above. In providing a class for kids it is a very common mistake to require that they should be "in pairs," which, strictly speaking, implies male and female. The objection to this is that an exhibitor who may possess a very good "nanny" kid, has an inferior "billy," or perhaps none at all to send with it.

and consequently either does not show his one good animal, or by sending both spoils his chance with the indifferent specimen. If the proper interpretation of the word "pairs" be not implied, and two males or two females are allowed to be entered, it generally happens that the former, on account of the extra size natural to their sex, take the prize. It is far more satisfactory, therefore, both to exhibitors and to the organisers of the show, to provide separate classes for each sex amongst kids as well as goats.

When the amount of prize money at the disposal of a committee admits of it, a class for goatlings—*i. e.* she-goats over one year old and under two years—should be provided, with a condition of entry that any exhibit that has borne a kid will be disqualified. A class of this kind was established a few years back at the Dairy Show, and the effect has been most marked in obtaining goats of increased size and bulk, in consequence of breeding being deferred until a perfect development of the frame is secured. The condition has always been that the goatling should not only never have *bred*, but that it should never have been *mated*. In consequence, however, of the difficulty of proving whether the animal is in young or not, supposing it to have been served within a month or so of the show, this maiden condition is not now required to be observed. There is this disadvantage, however, in allowing maiden goatlings and those that are in kid to be exhibited together, that the latter, by reason of their extra rotundity and the expansion of the ribs due to pregnancy, present a better appearance to the judge, although as a matter of fact they may not be really superior to the others.

To attract a fair number of entries there should be, if possible, three prizes in each class, and these should not be less in value than £2 for the first prize, £1 for the second, and 10s. for the third. If less than this, few breeders care to go to the expense of carriage, which, if over 25 or 30 miles, comes rather heavy. The entry fees are usually 4s. or 5s. for full-grown goats, and 3s. or 3s. 6d. for kids.

BENCHING AND FEEDING.

Goats never look so attractive at shows as when exhibited on raised benches in the same way as dogs. This of course comes rather expensive, and when the show is an open air one in a field, the goats are generally placed on the ground and divided by hurdles. If benches, however, are used, it will be rather cheaper to have them double, that is, a double breadth, 6ft. wide, divided down the middle by boards fixed horizontally. For full-grown animals the length of space allotted to each must be at least $3\frac{1}{2}$ ft. ; but 4ft. is better if it can be given. For kids $2\frac{1}{2}$ ft. is sufficient. In all cases posts should be inserted, or laths of wood nailed over each stall on which to fix the catalogue numbers of the exhibits and the prize-cards. These must be placed quite 6ft. from the ground or bench, otherwise the goats, by standing on their hind legs, will eat them down as fast as they are put up. This mischievous propensity has to be guarded against in another instance, viz. in the fastening of the direction-labels for travelling. These should always have a string at both ends, so that they may be attached to the horns or round the collar, and not hanging to the latter. Even then, if the goats get together, one will often demolish the label of the other, and nothing gives the secretary of a goat show more trouble than having a lot of goats at the close of an exhibition to send back to their owners by rail, and nothing to indicate in the way of a tally who they belong to. To avoid any such predicament it is necessary to furnish each exhibitor with a metal tablet stamped with the number of his goat according to the catalogue, which should be fastened on to the collar of the animal by copper wire. This is indestructible even to a goat. The price is about 10s. per gross.

Besides hay, it is necessary that some green food should be provided for the goats, in order to keep up as far as possible the yield during the time the exhibits are under the care of

the committee. To this end, if it is a summer or autumn show, arrangements should be made for a quantity of cut grass to be supplied, or if the season is too early or too late for this, a few roots. With the excitement and worry from the constant stream of exhibitors that are continually passing, goats do not consume much food at shows, and if the exhibition extends over several days the yield of the animal generally suffers in consequence. It is therefore very necessary that what food is supplied them should be as succulent as circumstances will permit.

JUDGING GOATS.

The points considered in judging are, in their order of precedence, usually taken as follows:—Size and shape, milking characteristics, quality of breed, age, condition and colour; the last-named being a minor consideration. I should observe, however, that this order slightly differs in judging at the Dairy Show, where the milking qualities are the first consideration, this being in accordance with the conditions under which the prizes are offered by the British Dairy Farmers' Association. Thus, a well-bred, large-sized goat, perfectly devoid of milk, which might at another show reign supreme, would here be passed over for a perhaps smaller or less well-bred specimen possessing greater milking powers. It must not, however, be supposed that the actual yield of the goat decides the award, for special prizes are given for the quantity and quality, quite apart from the ordinary class prizes; it is more the milking characteristics of the animal, taken in conjunction with its size and form, &c. Thus, for instance, an exhibit which may be giving only two or three pints a day, but which manifests all the outward appearance of a good milker, and of having yielded probably two or three quarts when it had first kidded, will, presuming it to be good in other points, take precedence of another, more recently kidded, and actually giving more milk, but older and generally less serviceable. Now, however, that size has

in some measure been improved, it is a question perhaps whether milking qualities, as the most practical feature to be encouraged, should not always be considered first.

Milking qualities :—This term will to some persons, perhaps, sound rather vague, and it may be asked, “What does it comprehend?” My answer is, that it implies something more than just the udder and teats of the animal, as some people suppose; in fact, this and one of the two next points in the order given —viz. shape—are closely connected, only it is shape in special regard to milking powers. A goat may be well formed in two ways, and judges may, perhaps, differ according to whether they lean to flesh, after the manner of shorthorn breeders, or to milk, as would a dairyman or breeder of Ayrshires or Jerseys. There is doubtless a great attraction in a massively-built goat with a wide chest, broad back, and well-covered ribs. These are qualities which are useful for breeding large stock, but they are not always associated with a heavy yield. The milking features are in many ways the reverse of this. The body is wedge-shaped rather than square—that is, narrow at the chest, and widening towards the hind-quarters, whilst the back rises slightly as it approaches the tail, and the body deepens towards the udder. This latter feature is by preference wide, and set well forward, rather than long, narrow, and hanging perpendicularly between the thighs; above all, it should be thin in substance, and soft and elastic to the touch, instead of thick and fleshy, giving the appearance of containing a large quantity of milk, but yielding comparatively little. The bag of a heavy milker will shrink considerably in size after its contents are emptied; but the fleshy receptacles belonging to some goats are quite as large after the operation as they were previous to it. The teats are a particular point of the milking features; they should be nicely tapered, set far apart, and measure from $2\frac{1}{2}$ in. to $3\frac{1}{2}$ in. long—just big enough, in fact, to be readily grasped by the hands. There are goats certainly which give a lot of milk with bags long and

narrow, and teats of such dimensions that they resemble little udders themselves, so much so that, when full, they are with difficulty handled. These are better than the round udder, like a ball, which has teats about 1in. or 2in. long, that can only be worked by a constant stripping process, and can never be grasped by any hand bigger than a child's. The three descriptions above given would take precedence at a show in the order named. Again, there are some goats which possess more than the normal number of teats. These extra appendages are regarded as a fault by judges, as indeed they in reality are. Very often a small teat is situated so close to the proper one as to allow milk to flow at the same time with it, on the pressure of the hand, but in a different direction, so that a certain proportion is of necessity wasted at each operation.

Shape and Size :—The shape, as far as it relates specially to milking qualities, has already been described, but there are some further features in connection with this point which are looked for generally, and require to be explained. Beginning with the head, this should be fine and tapering, with little or no beard (in short-haired specimens), the same words applying equally to the horns, which, if they exist at all, are preferred to incline or curl back over the neck. This should be slender, and rather long than short. The legs must be straight and strong, but not coarse, with hoofs compact and in good order. There should be plenty of bone and substance felt as the hand is placed over the withers and across the hips, the bones of the latter requiring to be wide apart. The back of a heavy milker is narrow, and the dorsal bone rather prominent, but the ribs must spring well outwards, and the stomach be well developed. A very general fault in goats is the pointed shape of the hind-quarters towards the tail.

Size is a feature which has much improved of late years, in consequence, doubtless, of the encouragement given since the establishment of goat shows to late breeding, in opposition to the practice, previously so general, of allowing kids to

mate when only seven or eight months old. It is in consequence of this that at all shows but the Dairy Show the size of goats has been the first consideration, and judges have passed over animals, no matter how good otherwise, that were of diminutive stature through too early breeding. A good-sized she-goat ought to measure 29in. from the ground on which it stands to the top of the shoulders or withers. It should be 34in. round the chest and 43in. round the barrel, and 43in. from the base of the horns to the root of the tail.* As regards the dimensions of a first-rate he-goat I may quote the measurements of that celebrated prize-winner "General," which were as follows:—Height 34in., girth round chest 42in., and round barrel 46in. This was, however, an unusual size, the more ordinary specimens being 32in. in height, 38½ at chest, and 43 round the barrel.

Quality of Breed :—This is another term which requires some explanation. It does not mean purity of breed, as some might suppose, for as yet there is no standard of points fixed for the different varieties; nor is it requisite at present that there should be, as far as exhibiting is concerned; it has, in fact, been the practice of judges to ignore purity of breed altogether, the prizes being offered with a view to encourage an improved type of milch goat, either by crossing known strains of our British varieties, or by the introduction of foreign blood. The word "quality" may perhaps be best defined as the reverse of coarseness: an animal that is symmetrically shaped, fine in bone, carries a close, glossy coat, with a soft delicate skin. It is that peculiar attractiveness which is recognised and admired by any one, whether the person be a judge or not, and it is a feature which, when possessed by both sire and dam, is almost certain to be transmitted to the offspring, unless one or other of the parents should throw back to some objectionable ancestor.

* These were the actual measurements of "Judy," the First Prize Goatling, aged 1 year 8 months, at the Diary Show, 1885, which for an animal so young was something extraordinary.

Age and Condition :—I have specified the most important points, and have now to deal with the minor considerations which require to be taken into account when competition runs close ; though, in judging kids and goatlings the age is of course a most important item, and has to be considered in relation to size. In full-grown stock, however, I deem it advisable that the animal which is past its prime should give place to a younger competitor that has some years yet before it, and will prove in the future the more serviceable of the two, although at the time it may not perhaps be so perfectly developed.

Condition may mean the “bloom of health,” or the “get up” for exhibition. It is a matter which either way cannot be entirely overlooked, though the former acceptation of the term is of far more importance than the latter. A highly-fed, well-brushed, shiny-coated goat, with polished horns, inspires admiration no doubt, but it is not rendered any more practically useful than its neighbour upon which less time has been spent to make it attractive. In fact, high feeding may produce a superabundance of fat, which is undoubtedly prejudicial to the animal’s breeding capabilities. Of course, a goat that is out of condition through being in ill health must necessarily be passed over, or if exhibited at a time when it is shedding its coat naturally, it would have to give place to another that had passed that stage, unless greatly superior in other points.

Colour and Markings :—It is rare that the merits of two or more goats are so closely allied that a judge needs to take this into consideration, and here goats are, perhaps, an exception to all other animals that compete for show honours ; indeed, it is a question with me whether the generality of judges are not too strict in this respect for the sake of practical utility—a white feather in the tail or wing of a fowl, or a few white hairs in a dog often cause first-rate exhibits to be passed over that might have otherwise won. We have not come to this, I am happy to say, in goats, and, indeed, it has yet to be shown that the

colour of one of these animals has any bearing whatever on its milking capacity. At the same time, we have doubtless our fancies in the matter, and most breeders prefer a whole or "self" colour, as it is unaccountably termed. For my own part, I must allow a partiality for the dark fawn, with the darker line down the back, and black points, or the dark red shading off to a rich tan, peculiar to the crossed Egyptian, Nubian, or Abyssinians, or finally, a pure black. Old writers on the goat speak of the latter as the best milkers, but I have never been able to prove this to be the case.

CONCLUDING REMARKS.

There is one more remark I would make in conclusion, and although not alluded to in the commencement among the points to be considered, it is one which I have often found necessary to take into account, in justice to exhibitors—that is, the fitness of the goat for the class in which it is entered. To make my meaning more plain, I will give an example. Supposing I am judging a class of short-haired goats, if the merits of two exhibits are very much alike, but one is short-haired throughout, whilst the other, though short-coated on its body, has long hair on the ridge of its back and on its thighs, I should decide in favour of the former. On the other hand, taking a long-haired class, if two goats were about on a par in the most important qualifications, but the hair of one was really long, whilst the other was questionably so, I should consider the long-haired one to comply best with the conditions of the class, and award it the prize. There are some goats which can scarcely be called "short-haired" or "long-haired," the length of their coats being something between the two, and such animals are apt to come off rather badly at a show; at the same time, in justice to the breeder, if a goat of this kind showed a far greater superiority to the rest, I, or any other judge, would of course sink the comparatively

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insignificant quality of fitness for its class for the other more solid virtues. A distinctly short-haired specimen in a long-haired class, or *vice versa*, would, however, be simply and summarily disqualified whatever its attributes might be, as then the rules of the show are contravened, and that could not be allowed.

CHAPTER XX.

DISEASES OF GOATS.

AFTER an experience with goats of various breeds, extending over a good number of years, I have been forced to the conclusion that these animals, under the conditions in which they are usually maintained in this country, are not the hardy creatures they are popularly supposed to be, and which I myself at one time thought them. No doubt in a wild or semi-domesticated state on the rocks and mountains where they love to roam, and where they obtain the kind of food best suited to their requirements, these, like most other animals under similar circumstances, rarely suffer from disease. But housed in over-heated and badly ventilated stables, or pastured on rich moist soil, this hardihood no longer exists, and goats become subject to some of the diseases common to sheep and cattle.

When I first wrote on goats I had always been most successful as regards their health, never losing a single one. Up to that date I had never kept more than two or three at a time, and those were to a great extent stall-fed. Subsequently, however, I moved to the neighbourhood of a large common, and with the facilities for pasturage thus afforded, increased my herd to a dozen, letting them room freely over the ground during the greater part of the year. I then learnt in a very practical manner what I have stated above, that goats are not as hardy as they are generally supposed, and the lesson has been repeated since under other, though similar, circumstances. This opinion,

however, is not based on my experience alone, but greatly by correspondence with numerous goat-keepers who, like myself, kept their animals during most of the year on grass. As I stated in my chapter on Pasturage, the nature of the soil has a great deal to do with this; a cold clay, insufficiently drained, always operating disadvantageously to these animals sooner or later. In every case that has come under my knowledge, the symptoms of the disease are the same, though no one appears to have arrived as yet at any definite conclusion regarding its nature. This fact, and the number of goats that every year are attacked with the malady, compared with the few that recover, render it highly necessary that the matter should receive scientific investigation. This at least has been the view arrived at by the British Goat Society, who, in order to throw some light on the cause of the disease, issued some time ago a series of questions for circulation among its members, soliciting answers from those who had had practical experience with the malady. The replies furnished are now in the hands of Professor J. Wortley Axe, of the Royal Veterinary College, and I only regret that his report has not been received in time for this work. At present, for want of a more definite title, I must describe this disorder as :

A DISEASE PECULIAR TO GOATS.

Symptoms :—The first thing that is noticed is a falling off of appetite, which may at first be slight, but soon gets worse, until it is a difficult matter to get the animal to eat at all. The result, of course, is that it rapidly loses flesh and falls away to a skeleton. Sometimes, however, the appetite remains tolerably good, but the emaciation goes on just the same, though the process is slower. The breathing is sometimes laboured, and the breath nearly always very unpleasant. A cough is very often an accompaniment of the disease, leading one to suppose, with other symptoms, that the lungs were affected, but this is seldom the case. The one prevailing feature which can never

be overlooked is the general bloodlessness of the animal. This is shown by the pale colour of the gums and inner surface of the lips, and also of the membranes lining the eyelids, which in health are of a bright red.

Before the disease is far advanced diarrhoea sets in, which begins with a slackness of the bowels. This soon gets worse, however, and though it may be stopped for a time it is almost sure to break out again, owing to the failure of the digestive organs from the impoverished condition of the animal. The diarrhoea may last for several weeks, but as it advances it often takes the form of dysentery. The poor creature then becomes too weak to stand, and it generally dies uttering plaintive cries and moans. There are other symptoms which occasionally manifest themselves, such as a swelling beneath the jaws, and weakness about the limbs, the animal always standing with its head down and back arched, looking the picture of misery and dejection.

Strange to say, in nearly all the post-mortems which have been made, and reported to me, there has been no organic disease. Internal parasites are sometimes discovered, but not in sufficient quantities to greatly affect the animal's health, much less cause its death, which in all cases is due to exhaustion. Both Professor Axe and Mr. A. J. Sewell, the consulting veterinary surgeon of the British Goat Society, have made numerous post-mortem examinations of goats that have died of this disease, besides treating several in various stages of the disorder, and both have arrived at the conclusion that it must be due to blood-poisoning, brought on from foul herbage, the result of over-pasturing—that is to say, keeping too many goats at a time on one piece of ground, or a few continually on the same ground.

The cases that have occurred in my own herds—and they have been numerous enough—have pointed to this cause; indeed, I could arrive at no other conclusion, for, whenever I

have changed my residence, and, consequently, the pasturage, the goats have always done well for the first twelve or eighteen months, and then deaths have occurred. In one instance, when I rented an extra meadow for a time, the goats in that meadow were doing well, whilst those on the field attached to the house were sickening. Then, again, almost invariably the reports of cases have come from persons keeping goats on pasture, rarely or never from those living in towns, whose goats were entirely stall-fed. At the goat farm in Surrey, where nearly 100 goats were kept, a large number died, although there was a considerable acreage of pasture, until the system was adopted of folding the animals like sheep, and constantly shifting their ground. Goats in kid that are attacked by this disease invariably slip their kids prematurely, and this further exhausting them, they rarely recover.

Treatment :—With regard to treatment, Mr. Sewell, in a discussion on this subject at a meeting of the Goat Society some years ago, recommended as follows: “Having first warmly housed the patient; which is very necessary, a mild dose of purgative medicine should be given. I say a mild dose, because the bowels, being in a relaxed condition, are more easily operated upon than if constipation were present. This medicine is given with the idea of removing any irritating matter that may be present in the intestines. Linseed oil and Epsom salts—it does not matter which is given—will do. The dose of oil for an adult goat of moderate size is from $1\frac{1}{2}$ oz. to 2 oz.; the dose of Epsom salts is about 1 oz. This is best given in a little warm oatmeal gruel, the oatmeal assisting the action of the medicine. After the purgative medicine has had time to operate, astringents must be given. The following is what I have used with the best success, namely, powdered catechu, chalk, and guin, of each $\frac{1}{2}$ dr.; powdered ginger, 1 sc.; and powdered opium, 6 gr. This is one dose, and should be given in a little wheaten-flour gruel, and be repeated two or three times a day, according to

the severity of the diarrhoea. As the diarrhoea lessens, the doses should be gradually decreased. It is a bad plan to discontinue the medicine directly the diarrhoea appears to have stopped, for the recurrence of it is often the result. The dose for kids (of the purgative medicine as well as the astringent) is from one-third to a half of that recommended for goats. When the diarrhoea is obstinate I have given bark with very good success. I have also given this medicine, if the appetite is very bad, after the diarrhoea mixture has been discontinued, as it acts as an astringent as well as a good tonic. The dose is about 30gr. of the powdered yellow cinchona bark. This medicine is also best given in gruel. I have heard that port wine and cayenne pepper is a capital mixture for diarrhoea, and though I have never tried it, I should think it would act well in mild cases. Nitrate of silver I have used with very good results in bad cases when the motions are accompanied with blood, constituting dysentery, the dose being a grain and a half to two grains twice a day. It is best given as a pili or bolus made with bread-crumbs."

When the diarrhoea stage is not arrived at, Professor Axe relies entirely on iron to strengthen the system, and give tone to the blood. He prescribes sulphate of iron in small doses of 5gr. each twice a day in water. I have added to this a small quantity of sulphate of quinine when the appetite has been very bad, and found it of great service. The best plan is to procure three or four 8oz. bottles, and put 2sc. of the iron crystals and $\frac{1}{2}$ sc. of the quinine into each bottle, giving 1 fluid oz. of the solution—which must be shaken occasionally as it dissolves—for a dose.

Food.—Feeding a goat in this disease is a difficult matter; like people in illness, it will often eagerly devour the very articles that it should not have, and refuse what is good for it. It will rarely, however, eat much of anything. All green fodder should, of course, be withheld when diarrhoea is present, though it will generally be taken readily when offered, probably for the sake of the change. Hay must constitute its chief food, and although

clover will often be preferred, good meadow hay I consider best, as the woody fibre in the sticks of clover must of necessity be more indigestible. I have had goats with this disease which for a long time have subsisted on nothing but hay and bread and milk, taking the latter most readily ; it would drink a quart or more of milk in a day. When the diarrhoea was present I mixed arrowroot or Oswego corn-flour with the milk. Goats will often take sloppy food like this very readily in illness when they would not touch it in health. Dry bread is usually eaten with a relish at this time, though corn of any kind is nearly always refused.

DIARRHœA AND DYSENTERY.

The outward appearance of these disorders being very similar, I class them together, although in reality they differ materially, the former meaning simple purging, and being a natural effort of the bowels to get rid of irritating matter ; whereas the latter consists in inflammation of the mucous membrane of the intestines, causing violent purging, and accompanied generally by fever and bloody evacuations. As dysentery frequently results from neglected diarrhoea, it is well not to allow the latter to continue too long before adopting remedial measures. It often happens, however, that a cure is effected, if taken in hand early, by simple change of food, or even of pasture ; should this have no effect, then medicine must be administered. I have found this disorder very prevalent with kids that are brought up by hand ; it being caused by giving the animal too great a quantity of milk after it has fasted. The treatment I have pursued with success in such cases is that recommended by Mr. Stephens in his 'Book of the Farm,' for the skit in lambs. It consists of an aperient combined with a gentle tonic, and may be made by mixing together $\frac{1}{2}$ oz. of Epsom salts with $\frac{1}{2}$ drachm of ginger, to which is added one tablespoonful of sheep's cordial, consisting of equal parts of brandy and sweet

spirits of nitre. This is to be given when the evacuations are of a yellowish white appearance. When, however, they are dark green, or still worse, black, in which case the matter is more serious, give an ounce of castor oil with a teaspoonful of oil of turpentine. Should the diarrhoea be but slight, and the creature lively, with its usual appetite, no notice need be taken of it ; but when the reverse is the case, then physic should be given without delay. Diarrhoea in full-grown goats is very common in spring, especially with goats that have been stall-fed all the winter, and kept chiefly upon dry food. The fresh spring grass in March and April is certain to cause scouring unless introduced very gradually, and in very small quantities at a time ; and it is often some days before the bowels can be got into their normal condition again. This change, in fact, should not be brought about suddenly, but by degrees, it being frequently necessary to clear the bowels with a dose of linseed or castor oil. For full-grown goats, if the purging be considerable, give $\frac{1}{2}$ oz. of prepared chalk, with two grains of opium, in a pint of warm milk, and repeat the dose in two days if the disorder continues.

There are several remedies besides chalk for this complaint ; sulphate of iron, for instance, is useful, given in small quantities, especially if debility is present.

In Germany the following receipt is in vogue :—

Myrtle berries	} of each 4 oz.
Juniper ,,	
Camomile flowers	
Prepared chalk	2½ oz.
Sulphate of iron	1½ ,,
Dose $\frac{3}{4}$ oz. twice a day.	

Baked flour is a good thing to give in such cases, and rice-water as drink.

In dysentery the discharges are thin and slimy, being frequently mixed with blood and hard lumps, and very offensive ;

the creature becomes weak and emaciated, and generally refuses food. This disease may be brought on from the goat eating decayed and decomposed vegetables, irregular feeding, or results from neglected diarrhoea. The animal must be kept warm in the stable, and have a good bed of straw and plenty of hay. If it refuse the hay, as it probably will if very ill, gruel must be administered to it. In the way of physic, $\frac{1}{2}$ dr. of rhubarb with 1oz. of Epsom salts, or 2oz. of linseed oil with 2gr. of opium in half pint of linseed tea, must be given to clear the bowels, and then the following mixture to act as an astringent: Prepared chalk, 1oz. ; powdered catechu, $\frac{1}{2}$ oz. ; ditto ginger, 2dr. ; ditto opium, $\frac{1}{2}$ dr. ; peppermint water, half pint. Mix these ingredients well together, and give from one to two teaspoonfuls twice a day, shaking the bottle previously. Afterwards a tonic, composed of powdered gentian and ginger, commencing with $\frac{1}{2}$ dr. of the former and 1scr. of the latter, and terminating with four times these proportions given in water, is valuable to restore and strengthen the system.

CONSTIPATION.

Constipation of the bowels only appears to any extent in kids, and, like diarrhoea, occurs mostly after weaning, when the stomach receives a change of food. It is not often dangerous, however, and will generally yield to a mild aperient in the form of an ounce of common salt, or, to one slightly stronger, as $\frac{1}{2}$ oz. Epsom salts, either administered in a quarter of a pint of warm water or gruel. The diet should be of a relaxing character with a bran mash every other day. Particular care should be taken to have plenty of rock salt accessible.

CATARRH OR INFLUENZA.

Goats that are accustomed to be kept constantly in warm stables not unfrequently suffer, if much exposed to damp and cold, from disease of the bronchial tubes and affections of the

respiratory organs. The symptoms of catarrh are a copious discharge from the nose and eyes, accompanied by sneezing; the eyes have frequently a bloodshot appearance. With bronchitis there is considerable difficulty in breathing, and a wheezing cough is present. The treatment consists in keeping the animal warm and quiet, feeding it on gruel and mashes, which, with a few doses of Epsom salts and ginger, will generally effect a cure. The proportions are about 1 oz. of Epsom salts to 1 drachm of ginger.

• **Foor-Rot.**

When kept much on low, wet ground, goats are liable, like sheep, but less frequently, to attacks of this disease, in which the hoof outgrows its natural proportions, not having that friction which on rocks and hard ground wears down the horn as it forms. The outer portions of the hoof outgrowing the inner parts, or frog, the former extends over the latter, which becomes soft, cracks, and lets in dirt and sand, which penetrate to the quick, causing great irritation and often ulceration. Inflammation having set in, the coronet swells, and portions or sometimes even the whole of the hoof becomes disorganised and breaks away. If taken in time this disease may be treated successfully, but the task is a troublesome one and unpleasant to perform. The hoof must be well and carefully pared with a sharp knife, taking care not to damage the quick or bed of the horn any more than possible. The part should then be thoroughly cleansed from all dirt with warm water, and dressed with a solution of carbolic acid, consisting of one part of the acid to 20 of glycerine. A poultice of linseed meal may then be applied for one or two days, after which the foot should be enveloped in cotton wool or tow, and enclosed in a coarse bag. The carbolic dressing is to be repeated once daily. If, in the course of healing, proud flesh (*i. e.* red wart-like excrescences) should appear, this must be overcome by caustic dressings, of

which nitrate of silver is the most efficient. Application of the caustic may be made once daily until the excess of growth has been overcome, and the surface of the wound brought to its proper level. Some recommend medicine to be given internally, at the commencement of the treatment, and administer Epsom salts, 2oz. ; sulphur, 1oz. Foot-rot is a disease, however, which may be prevented by occasionally examining the hoofs and paring away any horn that has exceeded its ordinary proportion.

GARGET.

“ Garget, black garget, or inflammation of the udder, is a serious ill, and if not taken in hand early and properly treated, is very likely to end fatally. It may be brought on from the goat getting chilled by lying on damp, cold ground after kidding, from blows to the udder, bad milking, or as the result of sore teats that have been neglected. The first symptom of this disease is the refusal on the part of the mother to allow her young to suck. When this is noticed the udder must be examined, and if the part feels hot and hard, it is a further sign. The goat must be separated from the kid and kept shut up in a warm, well-sheltered place. The udder must be emptied frequently. A dose of Epsom salts should be administered and repeated in three days, the udder, in the mean time, being freely bathed with hot salt and water. When the inflammation and swelling have subsided, the gland may be gently rubbed with soap liniment once daily. If this does not arrest the disorder, but the udder turns black, the services of a veterinary surgeon must be obtained.

SORE TEATS.

The teats of a goat are sometimes attacked with sores and ulcers, rendering both milking and the natural sucking of the kid most painful operations. The soreness is generally produced by the kid biting the teat, but other, and probably constitutional,

causes may bring it on. Although it may be considered a comparatively unimportant affair, it nevertheless requires attention, or, like other simple disorders, it may, if neglected, lapse into a more serious evil. The kid not being able to suck, the milk accumulates in the udder, and, as I just remarked, garget may ensue. The young goat must be temporarily removed from its mother, and fed by hand until the latter is able to suckle it. The teats should be dressed with the following ointment:—Goose grease, 8oz. ; camphorated spirits of wine, 2oz. ; common salt, 2oz. In mild cases, where they are but slightly cracked, goose grease alone will often effect a cure. I have latterly, however, used vaseline for this purpose, and find it answers perfectly. The milk must be drawn off twice daily, but the operation should be performed as gently as possible.

Poisons.

Although goats will consume with impunity many herbs which, if eaten by other animals, would rapidly cause death, there are, nevertheless, a few which are equally injurious to them—amongst these are the leaves of the yew, which, if taken in any quantity, will cause violent sickness, especially when the branches are dead. If given at once, the poison may be got rid of by administering strong doses of purgative medicine, such as linseed or castor oil, but a more effectual remedy, especially in bad cases, is the stomach-pump.

LICE.

These are a disgusting and troublesome pest, and with goats that are much petted by children, especially objectionable. They often appear in large numbers in the hair of goats or kids that have got into a low and poor condition from insufficient food or sickness. A good and simple remedy is to sponge the animal thoroughly with tobacco-water, to which a little spirits of tar has been added, the proportion being a wineglassful of

the latter to a quart of the decoction of tobacco. Mercurial ointment, diluted with seven parts of lard, is a very certain killer of these vermin, but it is a nasty process and a dangerous one, the ointment being very poisonous. An indiarubber syringe, charged with some insect-destroying powder, such as that sold by Keating, which on pressure is blown into the hair of the animal, has been employed with advantage in some cases. If goats are properly fed and cared for, however, and their coats occasionally brushed and combed out, such vermin will never exist.

ADMINISTERING MEDICINES.

A few words of advice on this subject may be useful, as much depends for success upon the manner in which medicines are administered. Those of a fluid consistence (and they should nearly always be administered in this form) should be made to trickle down the gullet as slowly and gently as possible, for, if poured hastily into the animal's throat, instead of remaining in the fourth stomach or abomasum, as it should do, it passes into the rumen, where it lies inert, and is therefore comparatively useless. A drench-horn is the proper utensil to employ in administering fluids, but an olu' teapot with a small spout answers the purpose very effectively. I have had goats which would drink linseed tea or gruel like water, but such accommodating animals are not common.

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